NPPD Generation Options Analysis (GOA) Customer Workshop

July 2, 2012

Holiday Inn Express

Columbus, NE

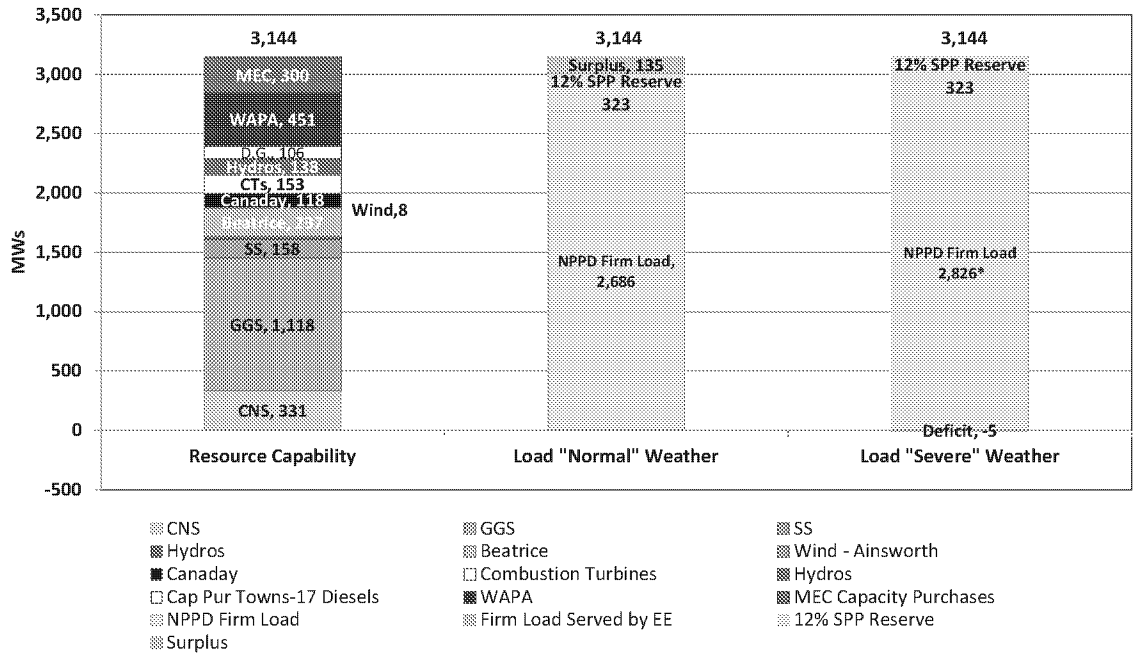
Agenda

NPPD RESOURCE PLANNING
CAPACITY VS. ENERGY

Capacity Planning

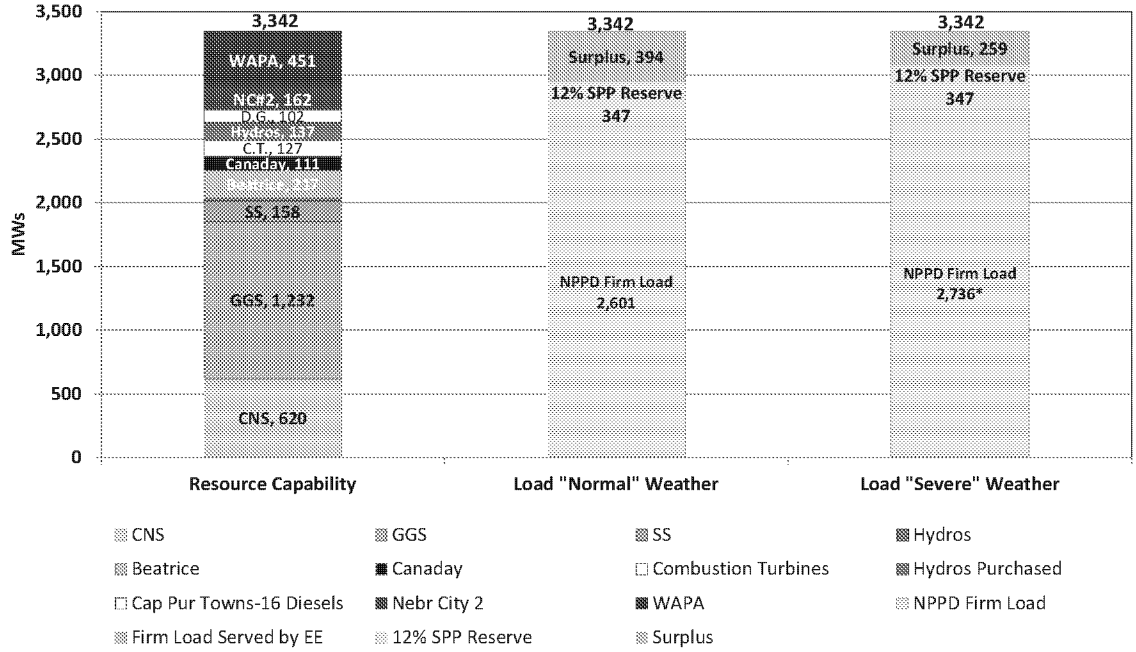
- Ability to meet instantaneous maximum load requirements with reliable generation during any particular period
- SPP requires 12% planning reserve requirements on members generation resources
- NPPD has been planning for capacity to meet normal weather summer peak loads
- Demand load control of primarily electric pump irrigation reduces summer capacity requirements by 400-600 MWs
- As capacity energy contract sales have expired, NPPD has recaptured 400 MWs since 2008
- SPP methodology currently calculates little summer capacity to wind

NPPD 2008 Load & Capability



*Excludes 300 – 600 MWs of Demand Control

NPPD 2012 Load & Capability

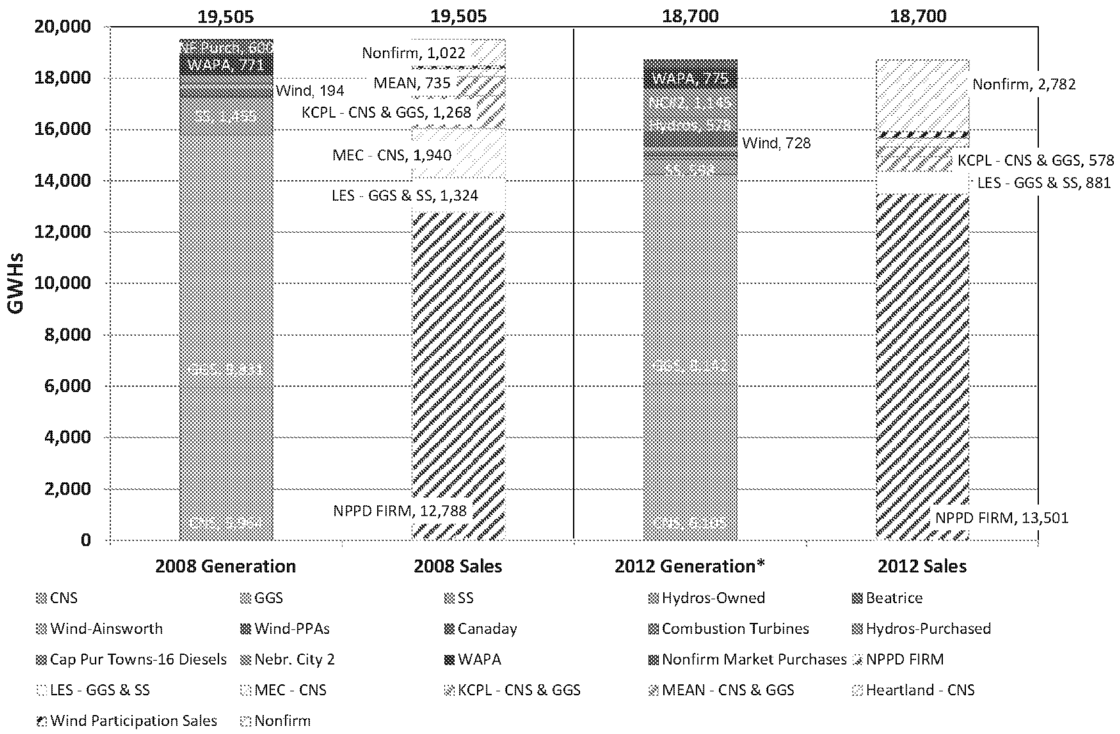


*Excludes 300 – 600 MWs of Demand Control

Energy Supply Planning

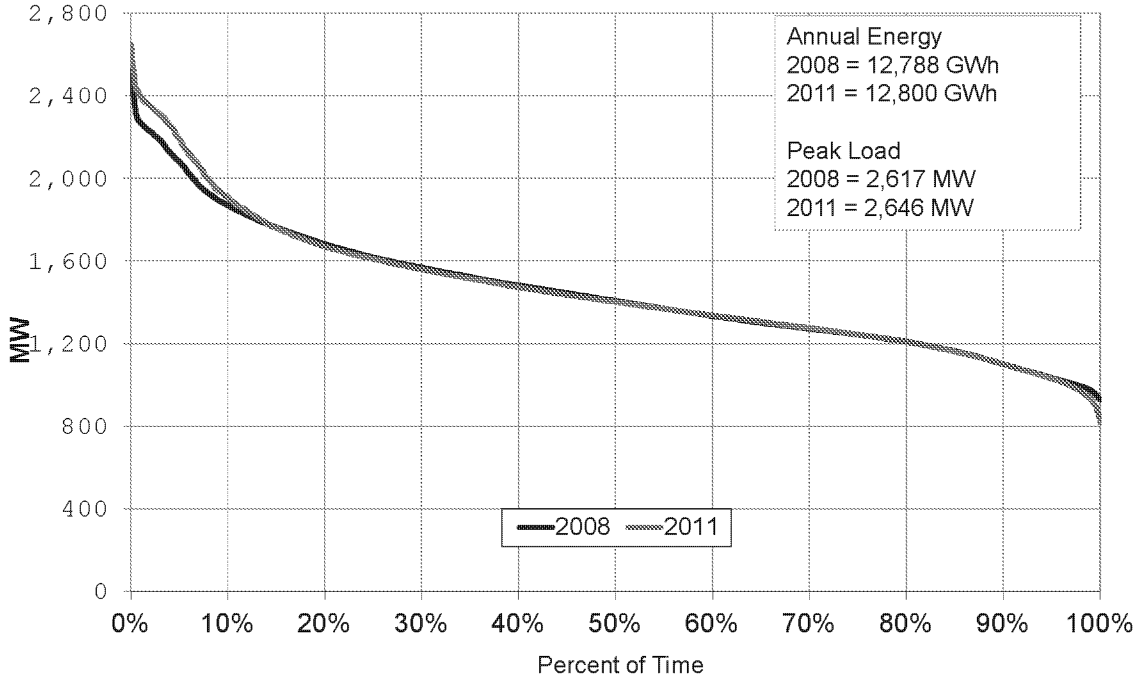
- Ability to reliably & economically deliver the energy requirements of our customers
- As capacity and energy contracts have expired, NPPD has recaptured 2,600 GWHs of baseload energy since 2008
- NPPD's participation in NC#2 has added an additional 1,100 GWHs of baseload energy to resource mix
- Membership in SPP provides NPPD with an additional market for energy needs
    - Energy imbalance

NPPD Energy - GWHs



* Budget assumed CSAPR in place.

NPPD Load Duration for 2008 and 2011



NPPD Generation Recapture

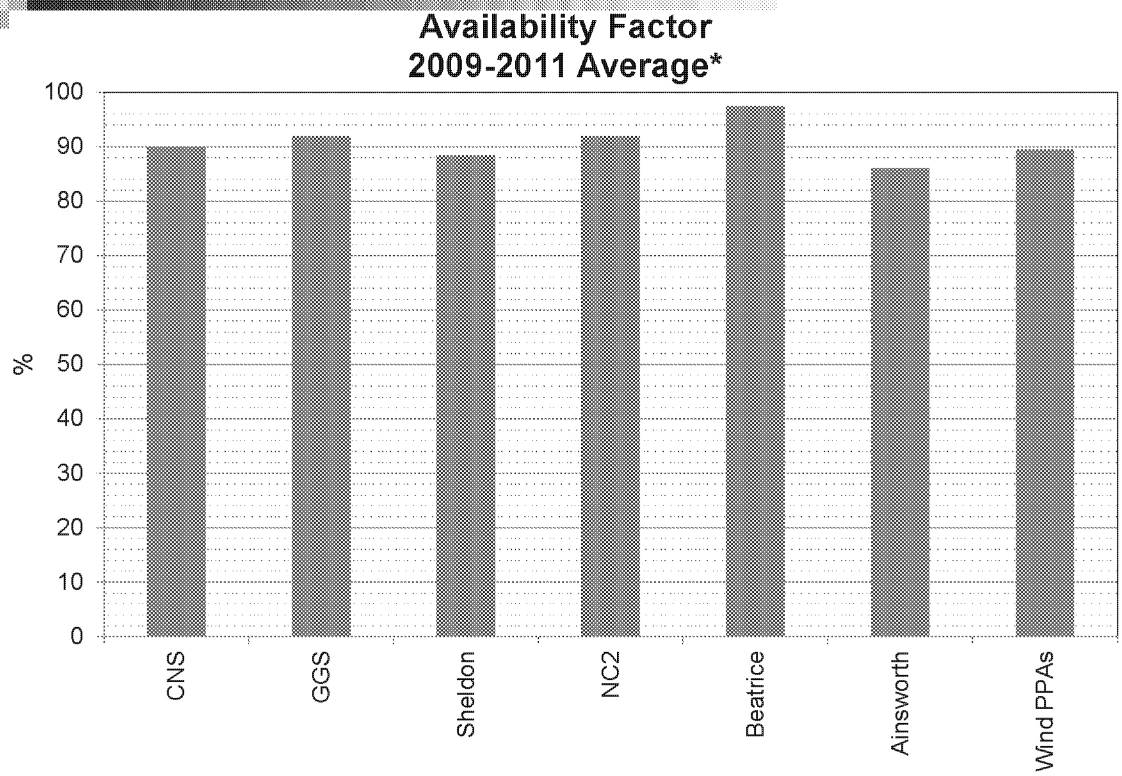
Contract	MWs	Available to NPPD
Heartland – CNS	45	Jan 2014
Kansas City Power & Light – CNS	75	Jan 2014
MEAN – CNS & GGS	50	Jan 2024
	170	

COST & OPERATING CHARACTERISTICS OF RESOURCES

Non-Carbon Resources (Energy)

	Nuclear	Non-Hydro Resources	Hydros	Total
NPPD Total Resources (2011)	28.2%	3.9%	8.6%	40.7%
NPPD Native Load (2011)	35.9%	3.8%	13.4%	53.1%
U.S. (2010)	20.2%	3.6%	6.8%	30.6%
West Central Region (2010)	15%	3%	2%	20%
LES (2011)				7.6%
OPPD (2010)	28%	2%		30%
MEC (2010)	12%	12%		24%
Basin (2010)		<3%		<3%
KCP&L (2010)	17%	1%		18%
MEAN (2010)		<4%		<4%

NPPD hydros include energy from WAPA.
U.S. & West Central Region data from NREL website.
West Central Region includes North & South Dakota, Nebraska, Kansas, Minnesota, Iowa, & Missouri.
LES data from their annual report.
Other utility data from Black & Veatch. OPPD data does not include WAPA energy.



*Accounts for refueling and maintenance outages

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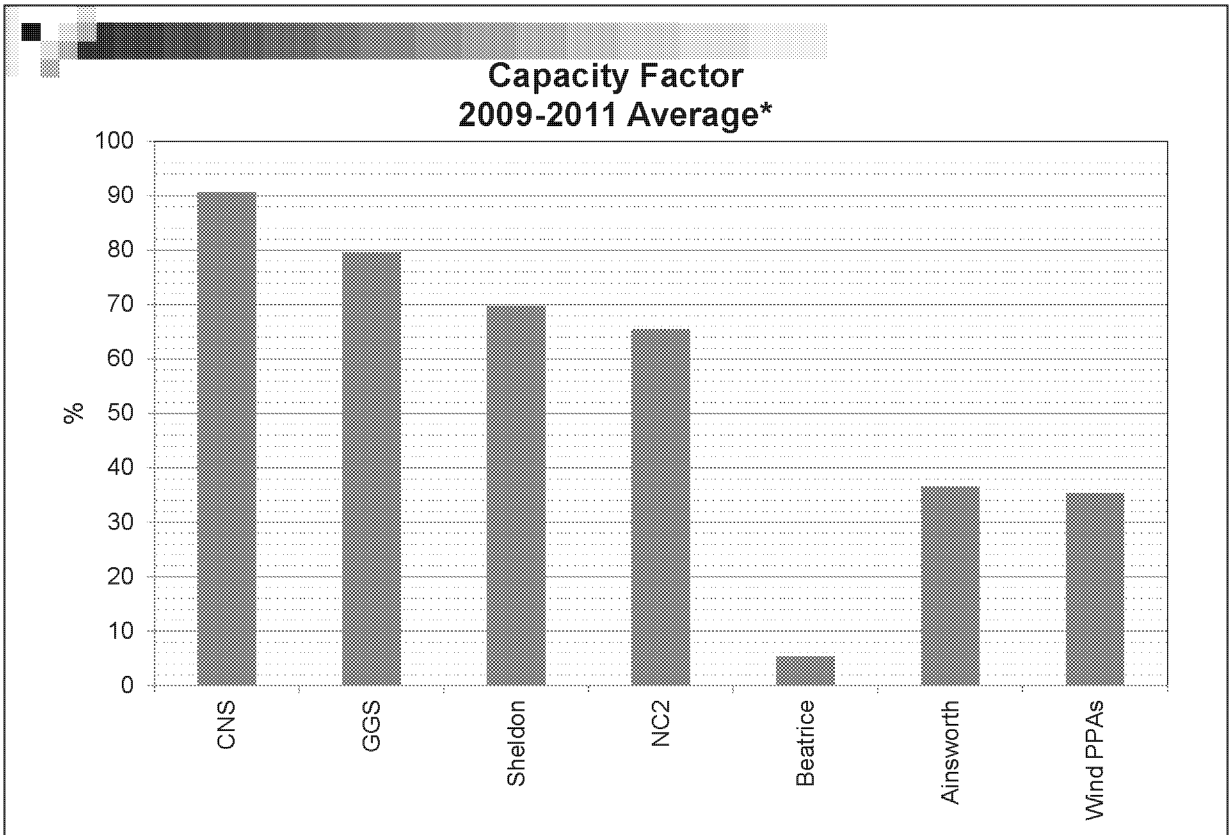

*Accounts for refueling and maintenance outages

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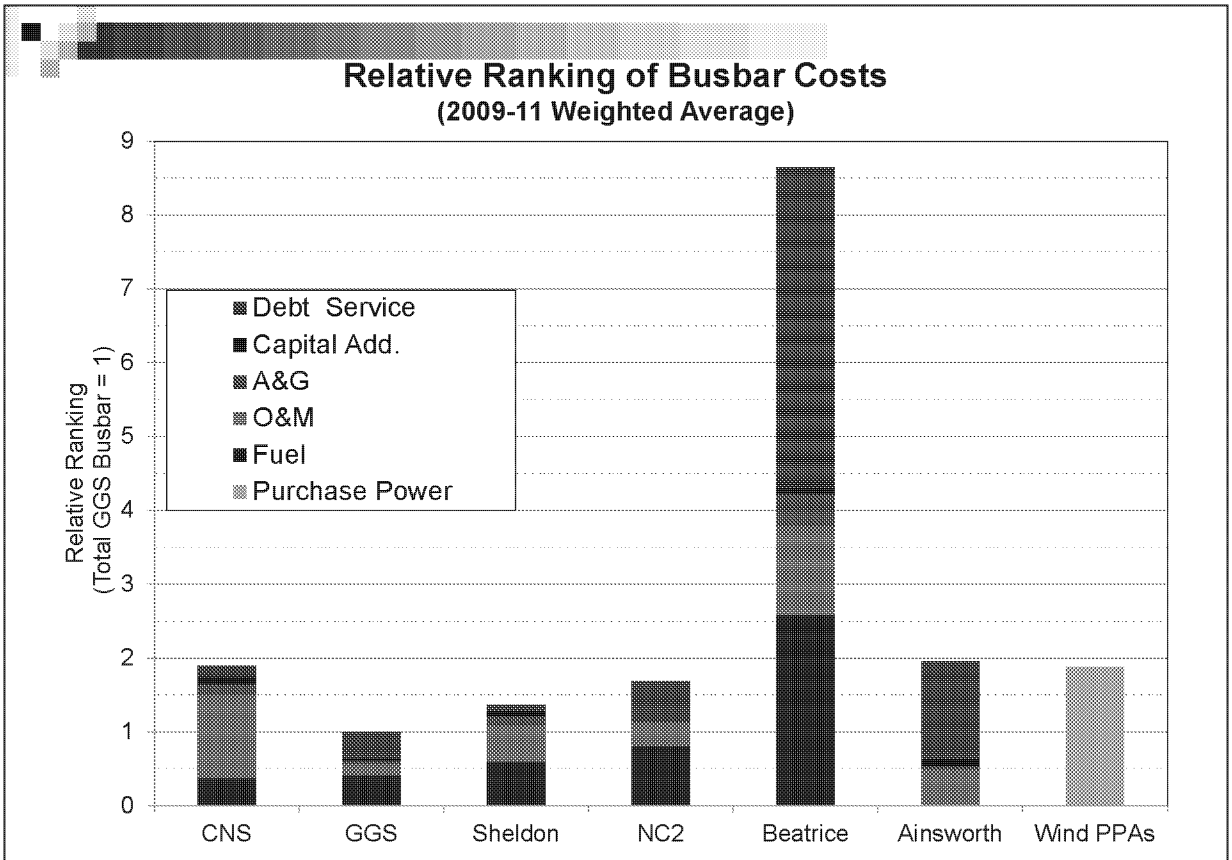
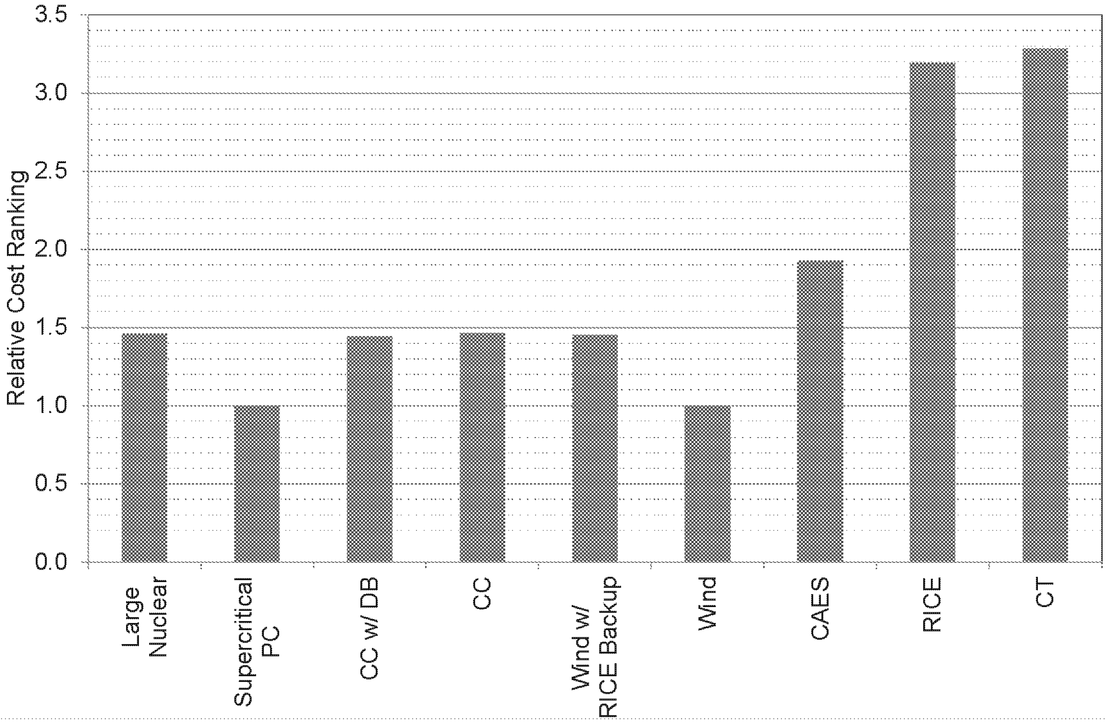

Relative Ranking of Busbar Costs
(2009-11 Weighted Average)
Relative Ranking
(Total GGS Busbar = 1)
0
1
2
3
4
5
6
7
8
9
Debt Service
Capital Add.
A&G
O&M
Fuel
Purchase Power
CNS
GGS
Sheldon
NC2
Beatrice
Ainsworth
Wind PPAs

New Unit Cost Estimates* - GOA



Capacity Factor:	90%	85%	85%	85%	60%	40%	30%	10%	10%

*Includes fixed and variable (fuel) costs

New Resource Cost Assumptions

New Resources 2011 $		Capacity MW	Capital ($/kW) Installation in 2011	2021	Non-Fuel O&M Costs Fixed $/kW-yr	Variable $/MWh	Total M$/yr	Full Load Heat Rate Btu/kWh
Baseload	Super Critical PC	600	2,672	3,420	51.79	4.04	49.12	9,260
	IGCC	579	4,980	6,374	59.23	6.87	63.91	9,426
	CNS EPU	141	1,468	1,879	2.58	-	0.36	See notes
	Nuclear	1115	6,275	8,032	90.90	7.47	167.02	9,300
	Small Nuclear	450	6,902	8,835	113.63	7.47	77.63	9,800
	CC (2x1) F Class	499	1,352	1,731	17.00	5.50	28.92	7,095
	CC (2x1) F Class w/DB	632	1,186	1,518	14.09	5.00	32.44	7,261
Intermediate / Peaking	CC (1x1) F Class	249	1,636	2,094	23.37	5.50		7,107
	CC (1x1) F Class w/DB	315	1,410	1,805	19.40	5.00		7,272
	CT - F Class	172	833	1,067	9.54	10.50		10,420
	CT - LMS100	80	1,547	1,981	17.07	4.30		9,255
	ICE	187	1,082	1,385	9.69	5.90		8,443
Storage / Renew	PSH	1336	2,131	2,728	2.95	1.05		-
	CAES	300	920	1,177	3.00	5.00		-
	Wind	80	1,800	2,304	8.05	6.88		-
	Solar	25	5,727	4,032	15.00	-		-
	Hydro	4	3,164	4,050	28.29	-		-

NOTES:
Combined cycle units can be used as either baseload or intermediate resources.
Total maintenance costs are based on 85% capacity factor for fossil units, 90% for nuclear.
Duct burners on combined cycle plants estimated at $350/kW and 9000 Btu/kWh heat rate.
Combined cycle units include high level estimate for gas pipeline expansion.
PSH and CAES costs do not include additional transmission.
Solar capital cost expected to decrease by 45% by 2021
EPU incremental fuel costs ~$4.98/MWh (2011 $)
Source - 2010 EPRI TAG; Consulting A/E Firm

NPPD GOA/IRP RESOURCE PLANNING PRINCIPLES

Guiding Principles for the GOA

- Must align with NPPD's Strategic Plan regarding **Diverse Generation**

Strategy	Strategic Goal
NPPD and the industry is experiencing unprecedented environmental regulation and uncertainty, much of which is focused on fossil fuel production. NPPD will maximize the value of our current assets and minimize expenditures. In line with this approach:	
a) NPPD will further diversify its mix of generating resources (nuclear, coal, gas, hydro, and renewables including wind, energy efficiency and demand response) and energy storage, capitalizing on the competitive strengths of Nebraska (available water; proximity to coal, wind).	Achieve 10% of our energy for NPPD's native load from renewable resources by 2020. Evaluate options to include energy efficiency as a component of the renewable resource goal. Update the Integrated Resource Plan and look at additional expansion plans that evaluates alternatives to NPPD's current resource mix and increase the use of sustainable resources. Diversification with trend toward cleaner energy.

Guiding Principles for the GOA

- Must align with NPPD's Strategic Plan regarding **Diverse Generation** – (cont'd)

Strategy	Strategic Goal
b) NPPD believes in the value of owning assets.	
c) NPPD will maximize the value of existing generation assets consistent with public safety and environmental compliance, and cost effectively improve the efficiency of its generation operations and facilities.	NPPD's generation will achieve top quartile performance for base load units.
d) NPPD will protect and/or enhance the District's water rights for current and future power production and provide water for surface water operations and other opportunities.	

Guiding Principles for the GOA

- Must align with NPPD's Strategic Plan regarding **Environmental Responsibility/Sustainability/ Technological Innovation**

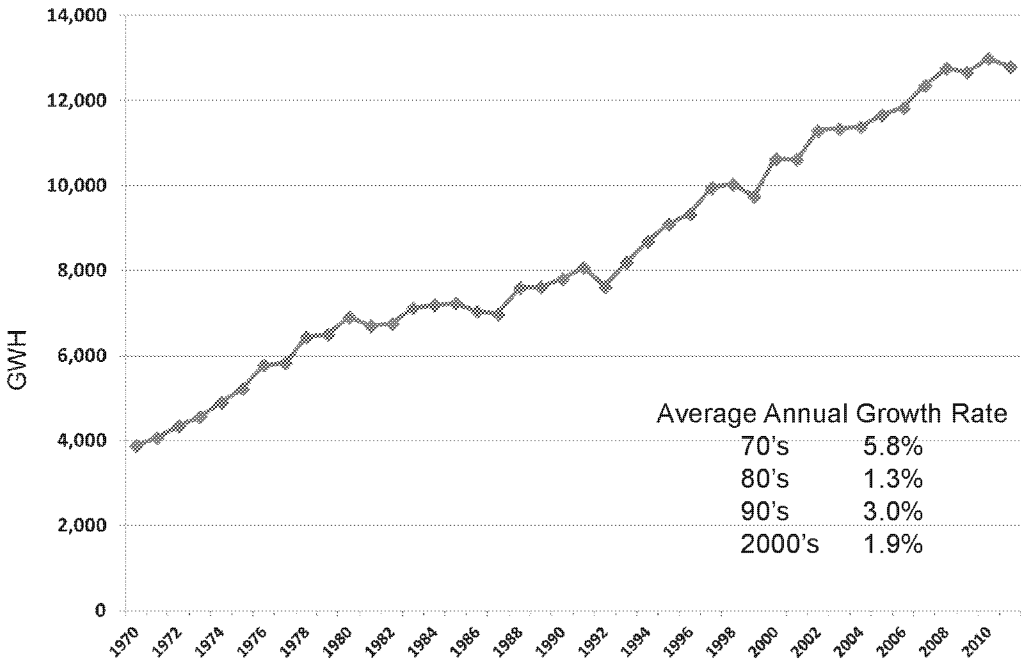
Strategy	Strategic Goal
NPPD will maintain a culture of environmental stewardship and demonstrate these values through its operations, employees and practices.	Frequent review of Environmental Goals

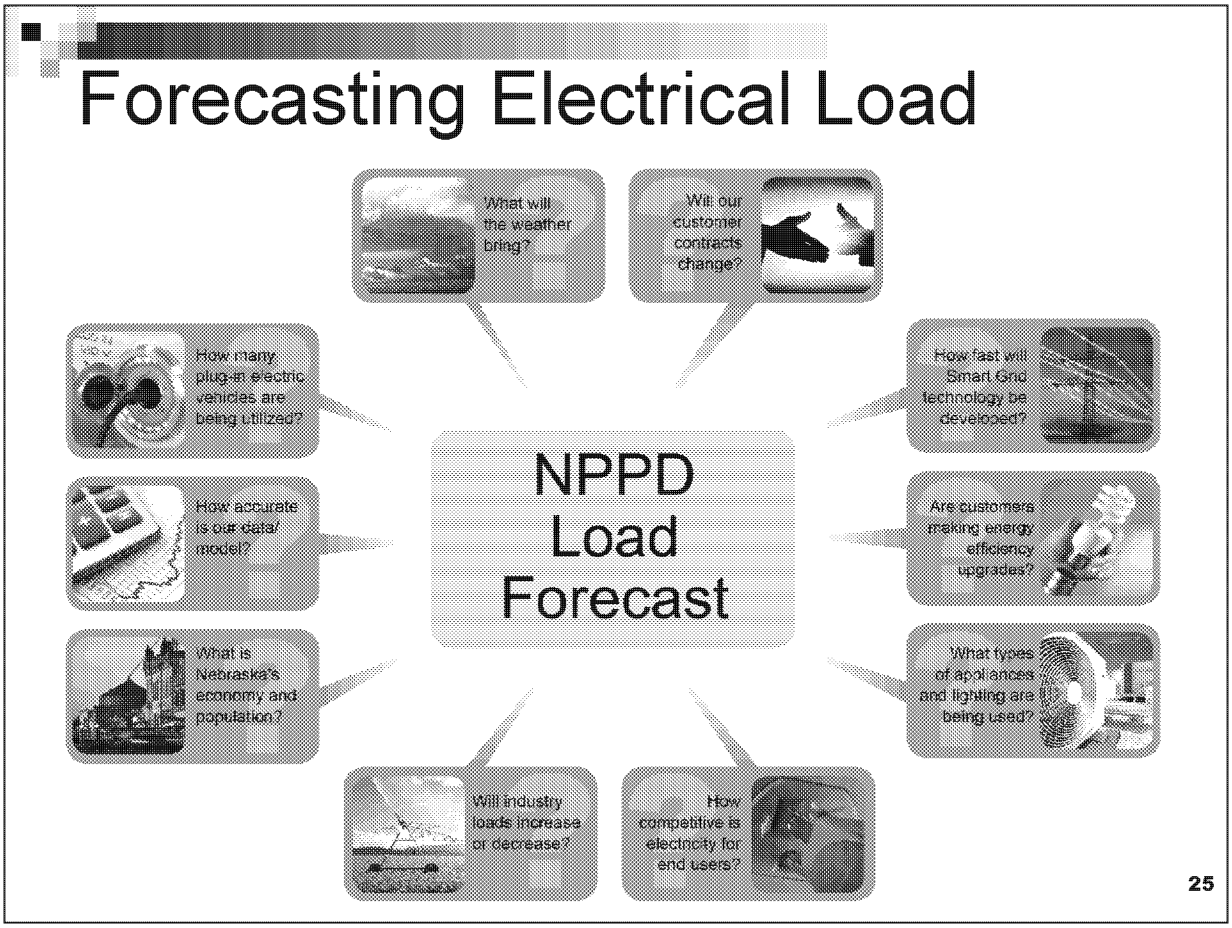
NPPD’s Guiding Principles

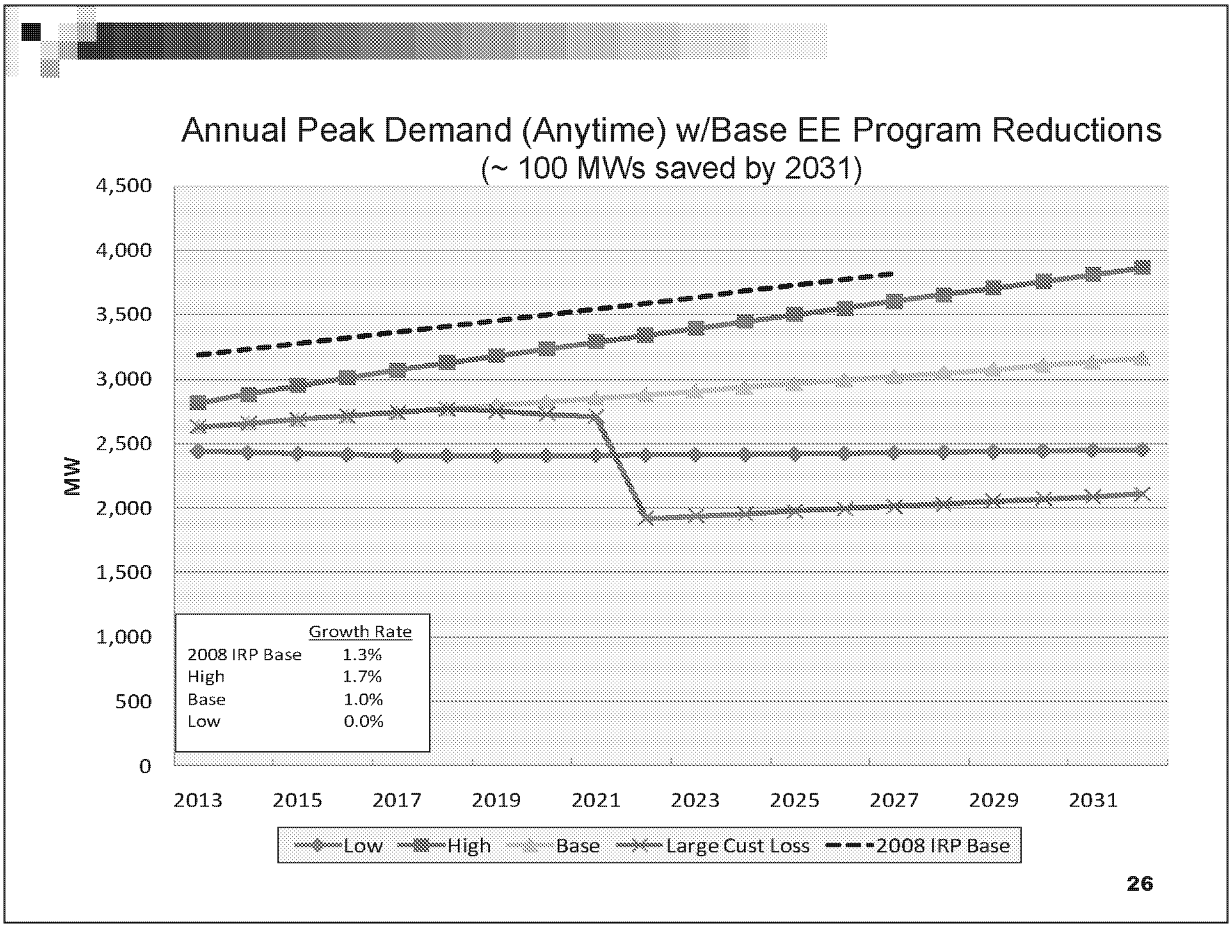
1. As a public power utility, NPPD seeks a reliable, low-cost, and low-risk resource plan to safely serve customers’ needs.
2. NPPD is required to have an integrated resource plan.
3. NPPD matches its generation resources to customers’ load requirements.
4. NPPD minimizes risk and controls costs by owning our generation and transmission assets, looking for market advantages, and researching new technologies for our customers.
5. NPPD believes a diverse generation resource mix minimizes your cost and helps serve our customers best.
6. Every resource plan option studied includes renewable energy resources, energy efficiency and demand side management.

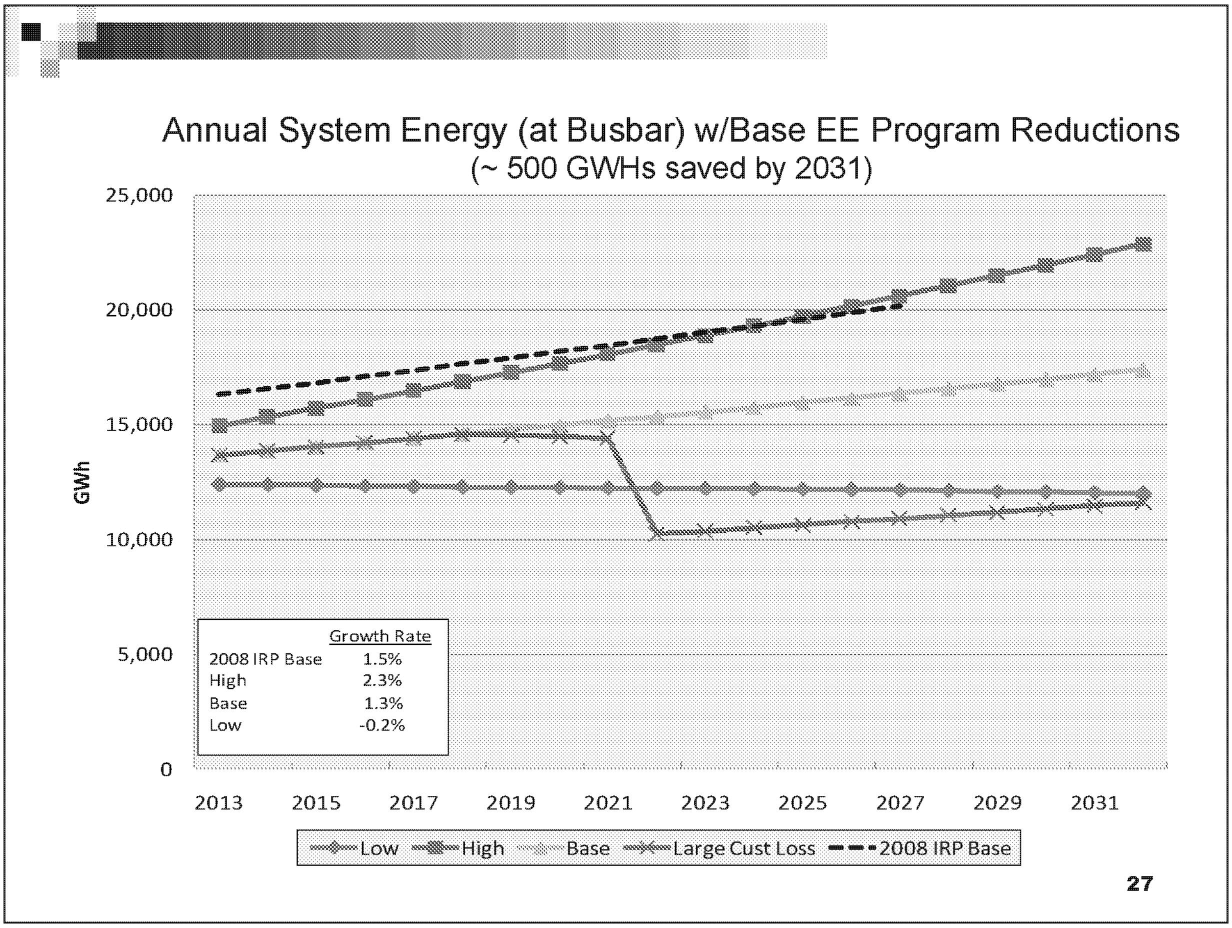
PLANNING TO MEET NPPD'S FIRM NATIVE LOAD GROWTH

NPPD Historical Energy Usage



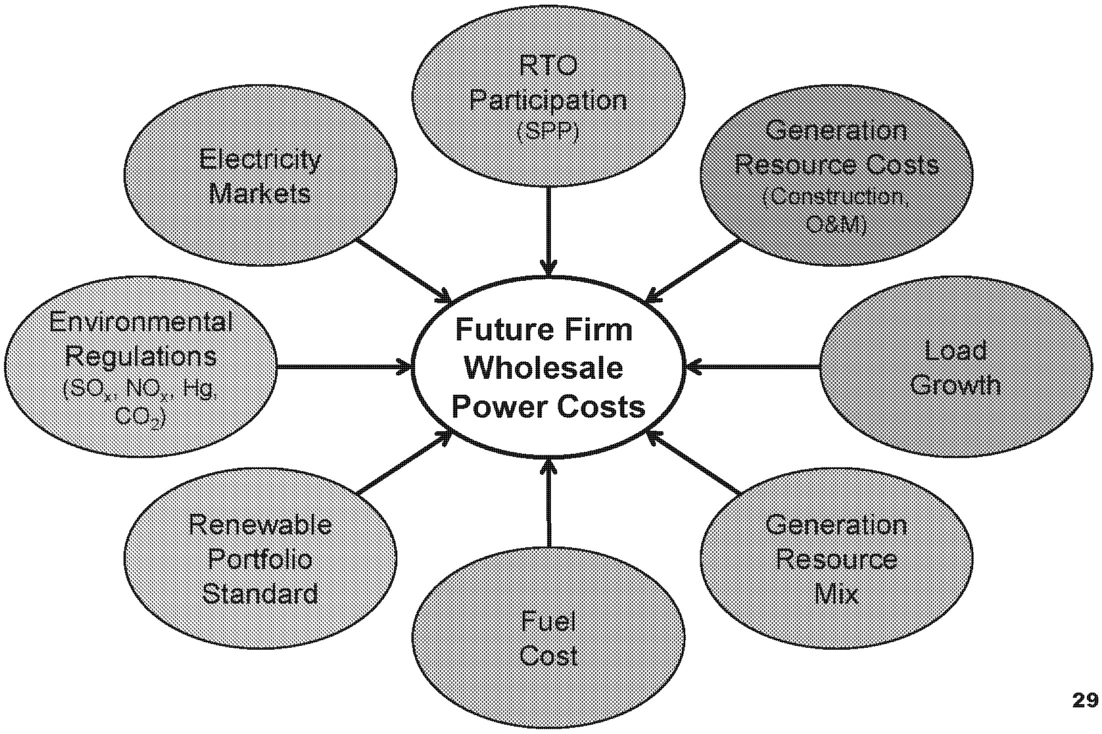

Forecasting Electrical Load
What will the weather bring?
Will our customer contracts change?
How many plug-in electric vehicles are being utilized?
How fast will Smart Grid technology be developed?
NPPD Load Forecast
How accurate is our data/ model?
Are customers making energy efficiency upgrades?
What is Nebraska's economy and population?
What types of appliances and lighting are being used?
Will industry loads increase or decrease?
How competitive is electricity for end users?
25


Annual Peak Demand (Anytime) w/Base EE Program Reductions
(~ 100 MWs saved by 2031)
MW
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
Growth Rate
2008 IRP Base 1.3%
High 1.7%
Base 1.0%
Low 0.0%
Low
High
Base
Large Cust Loss
2008 IRP Base
26


Annual System Energy (at Busbar) w/Base EE Program Reductions
(~ 500 GWHs saved by 2031)
25,000
20,000
15,000
10,000
5,000
0
GWh
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
Growth Rate
2008 IRP Base 1.5%
High 2.3%
Base 1.3%
Low -0.2%
Low
High
Base
Large Cust Loss
2008 IRP Base
27

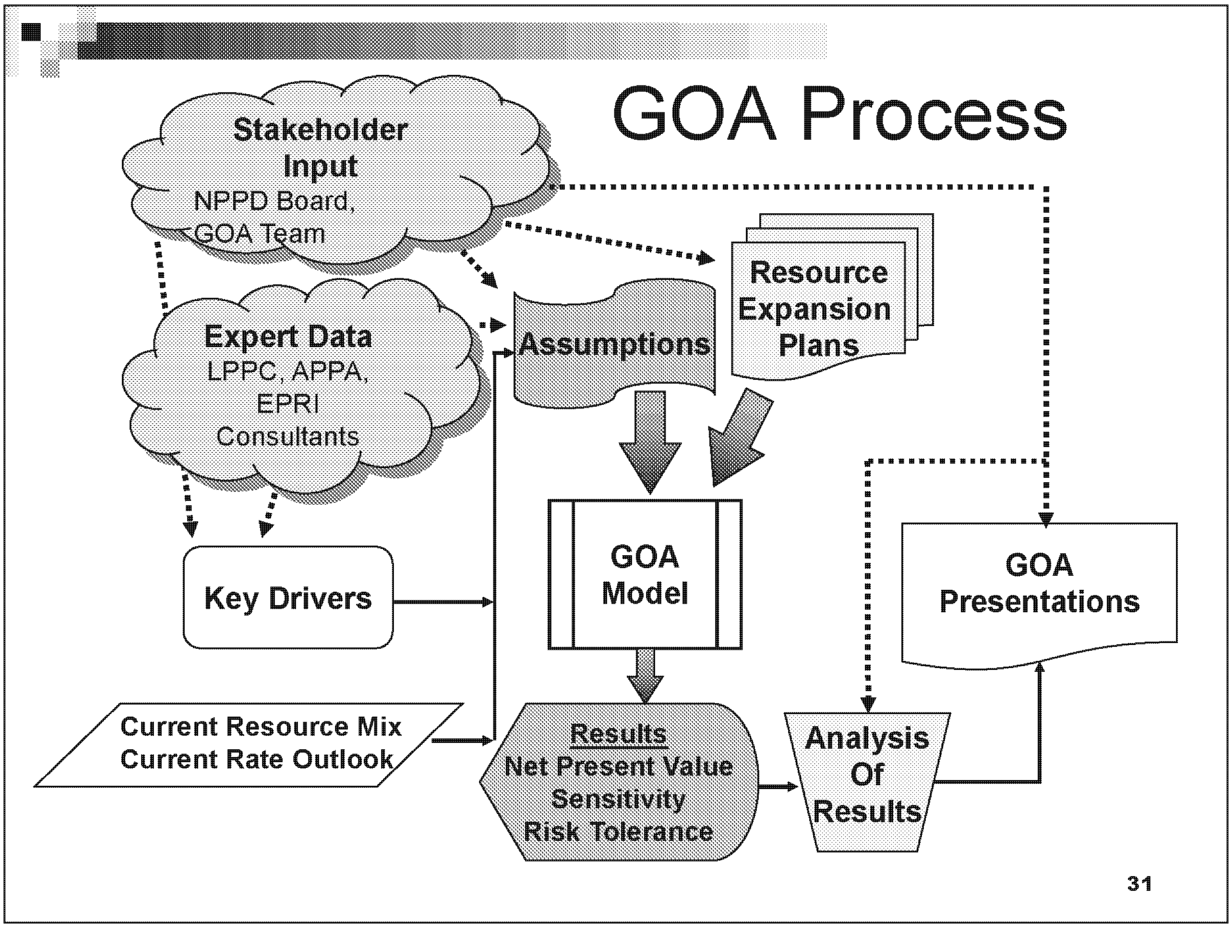
NPPD GOA (IRP) MODEL

Key Drivers – Future Wholesale Power Costs



NPPD GOA (IRP) Model Fundamentals

- An analytical computer model that integrates several different software applications
- A number of Key Drivers of NPPD's Future Wholesale Power Cost were identified for different generation resource mixes and modeled quantitatively including:
  - The projected price of electricity in the regional market
  - Projected generation costs for existing and future resources; operations & maintenance, capital, and fuel
  - Projected generation resources operating performance
  - Future possible air and water environmental regulations and associated compliance costs
  - Projected dismantling costs of existing resources
  - Load forecast uncertainty


GOA Process
Stakeholder Input
NPPD Board, GOA Team
Expert Data
LPPC, APPA, EPRI
Consultants
Key Drivers
Current Resource Mix
Current Rate Outlook
Assumptions
Resource Expansion Plans
GOA Model
Results
Net Present Value
Sensitivity
Risk Tolerance
Analysis Of Results
GOA Presentations
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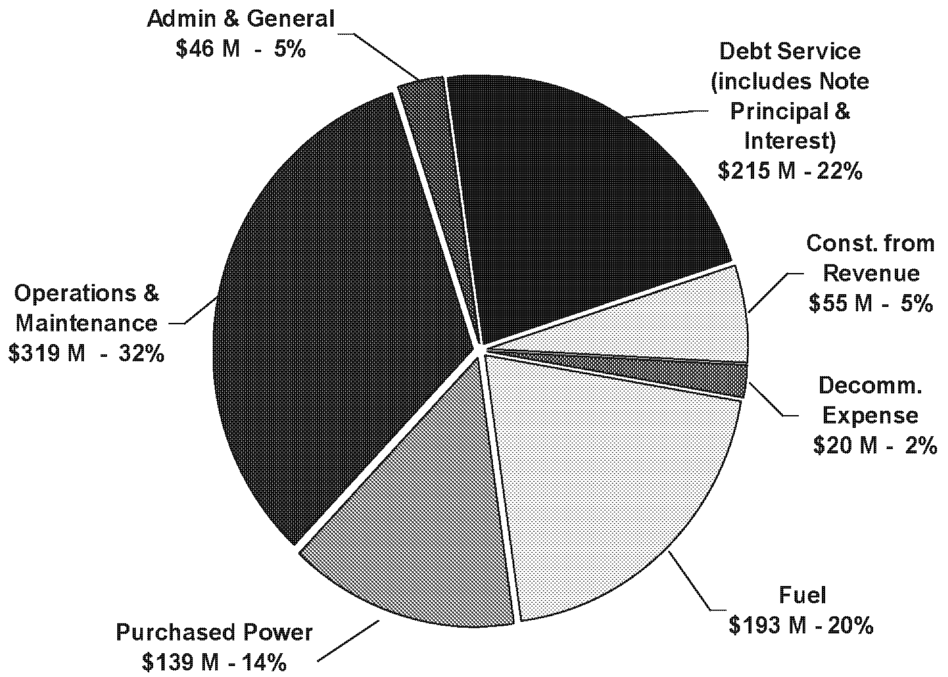
NPPD GOA (IRP) Model Fundamentals

- Probabilistic outcomes associated with each resource portfolio
  - Values input for each of the specific model uncertainties at the 10th, 50th, and 90th percentile points.
    - Generally, the 10th percentile value means there is a 1 in 10 chance that the outcome for that specific uncertainty will be lower than the data input into the model,
    - Similarly, the 90th percentile value means there is a 1 in 10 chance the outcome for the same specific uncertainty will be higher than the data input into the model
  - The bar charts shown later in the results section identify an Expected Value (EV) for each future possible generation resource mix
    - Expected Value is the probabilistic outcome of each option, given the data input at the 10th, 50th, and 90th percentile points
    - The width of each bar illustrates the “range of uncertainty” or risk associated with each resource portfolio mix. A narrower or smaller bar width around the Expected Value indicates less risk, or a more certain outcome, when compared to other resource portfolios.

Wholesale Revenue Requirement (WRR) Projection

- Step 1 – Begin with Annual WRR projection (Prod & Trans costs) for the current Rate Outlook period.
  - Reduce the annual WRR total for those costs/revenues that will be varied in the resource plans (e.g., GGS & Sheldon operating costs).
  - The remaining costs are then escalated at a nominal annual rate (e.g. 2.5%) to form the annual residual WRR estimates over the remainder of the study period.

2012 Pro-Forma Wholesale Operating Budget
Est. Expenses – $987 Million
(Gross Production & Transmission Costs)



Wholesale Revenue Requirement Projection

- Step 2 – For each future resource plan, add to the residual annual WRR projection (developed in step 1), the appropriate additional costs (GGS & Sheldon operating costs, MPCE costs; CNS EPU costs, future resource capital & operating costs; etc.)
  - Result is a cash flow of annual WRR values for that resource plan over the study period.
  - The annual values are then discounted to a common year (e.g., 2013) and summed to produce a Net Present Value (NPV) of WRR.

Wholesale Revenue Requirement Calculation

(Production and Transmission)

	Rate Outlook						
	2013	2014	2015	2016	2017	2018...	2032
GGS, Sheldon, CNS, & Canaday							
Existing Debt	+						
O&M and Future Debt (as required)	+						
MPCE Debt and O&M (as required)	+						
Fuel costs	+						
less Participation and Capacity Sales Revenue	-						
Future Supply-Side Resource Additions							
Debt, Fuel, and O&M	+						
Energy Efficiency Program Costs	+						
Future Wind Resource Additions	+						
Additional net Production Costs							
Other unit fuel/enery costs (Neb City 2, CTs, Capacity Purchase, Hydro, WAPA, existing Wind PPA)	+						
Non-firm energy purchases	+						
less Non-firm energy sales revenue	-						
Air Emission Allowance Costs (SO2, NOx, CO2)	+						
Residual Production and Transmission Wholesale Revenue Requirements (from step 1)	+						
Total Annual Wholesale Revenue Requirements							

Wholesale Revenue Requirement Projection

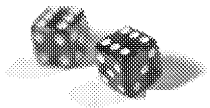
- Step 3 – High, base, & low values are estimated for those inputs that are key drivers (e.g., load forecast, fuel price, allowance costs, etc.) and the WRR are recalculated
  - Perform a probabilistic analysis to calculate Net Present Value
    - Using a technique called Monte Carlo Simulation

Monte Carlo Simulation

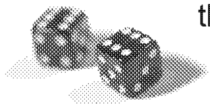
- A proven technique to evaluate risk by constructing a model and repeatedly substituting a range of values (low/base/high) for variables that have inherent uncertainty (native load, fuel costs, CO_2, market prices, etc.)

Select random draw #1 . Calculate and record results (NPV).

Select random draw #2. Calculate and record results (NPV).



Select random draw #n. Calculate and record results (NPV).



Repeat many times… e.g. 5000

After the final draw, tabulate results from all draws (average/expected NPV, min, max, percentiles, etc).

- The output not only shows the expected results, but a range based on the uncertainty of the inputs.
  - Easy to see which variables have the greatest impact on the results.

Simple Example of Expected Value Calculation

- Assume natural gas price in 2012 could range from:
  - Low \$2.00/mmbtu
  - Base \$2.50/mmbtu
  - High \$3.50/mmbtu
- Expected Value (EV) = \$2(.25) + \$2.50 (.50) + \$3.50(.25) = \$2.63/mmbtu

High Level Dispatch

- An integral part of the GOA Model is the High Level Dispatch algorithm
- Purpose: Estimate annual generation from existing and future resources, including non-firm transactions, over the study period
  - Used to compute variable production (fuel + VOM) costs
  - Used to estimate annual air emissions (e.g., SO2, NOx, CO2) and associated allowance costs
- Approach needs to be:
  - Flexible
  - Fast
  - Accurate

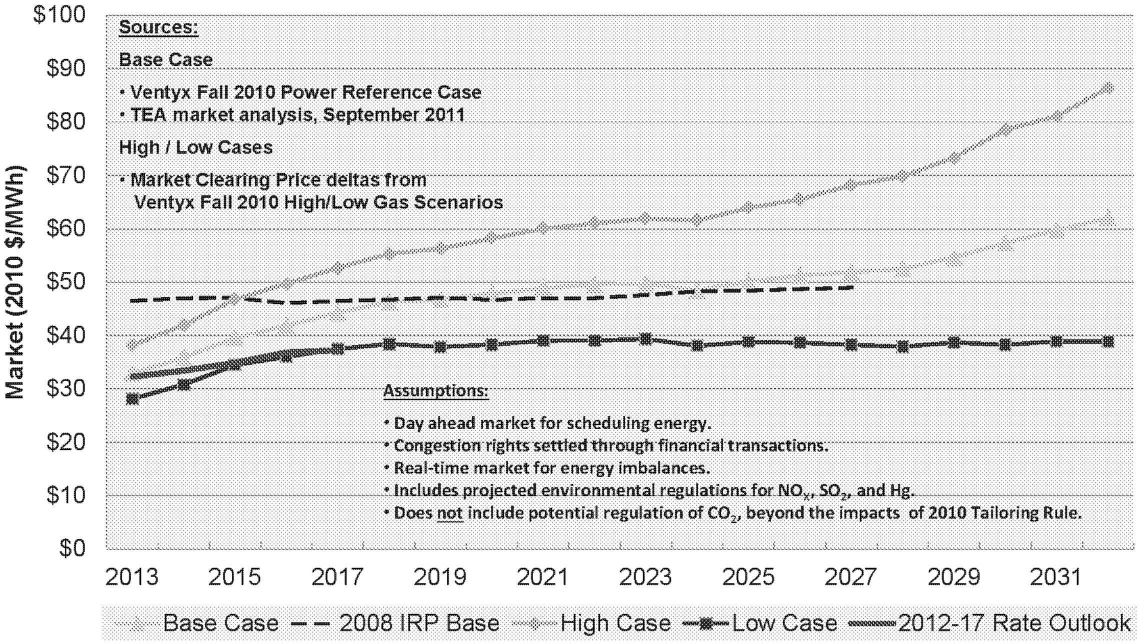
High Level Dispatch

- PROMOD®, a commercially available production model, was used to calibrate the High Level Dispatch model
- Thirteen PROMOD simulations were made for the GOA model calibration process
  - Included variations in resource plan (including future wind/EE) , load forecast, fuel/market price, emission allowance price
  - PROMOD results used to develop predictive equations for: non-firm sales volume & price; non-firm purchase volume and price; dump (surplus) energy sales volume; Beatrice Power Station (BPS) generation
  - Results from High Level Dispatch were compared to PROMOD results for selected simulations and used to adjust the GOA model calculations

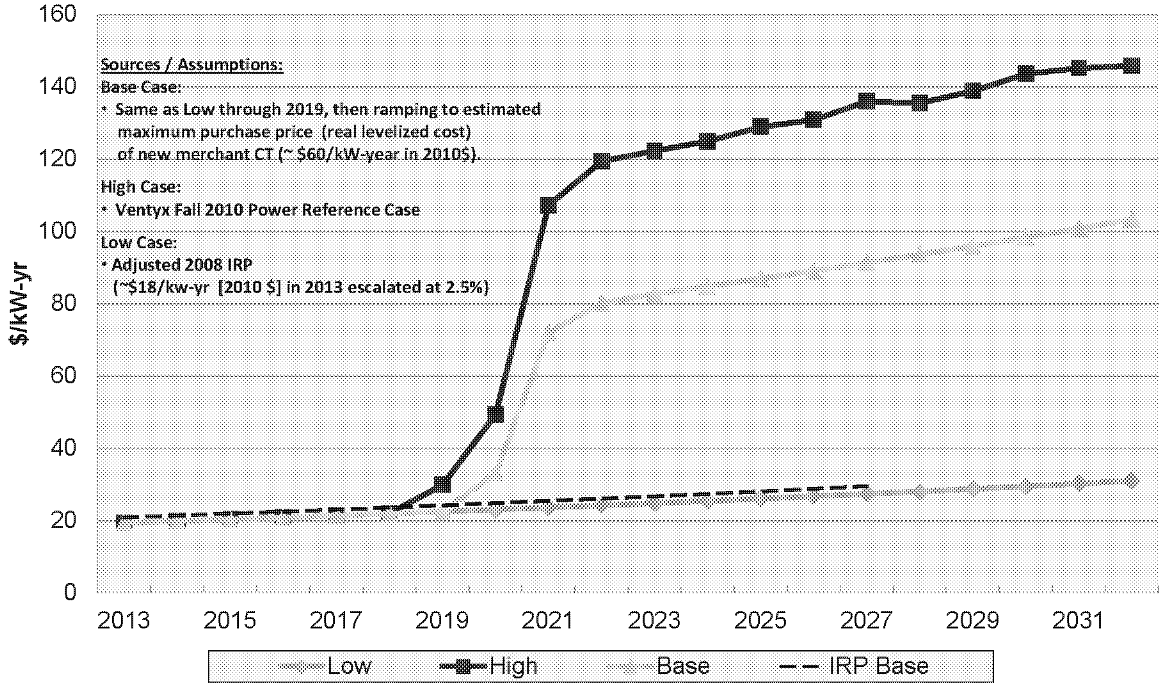
NPPD GOA MAJOR UNCERTAINTY ASSUMPTIONS

Market Prices

Market Price Projections (7x24)



Capacity Purchase Price



Sustainable Energy

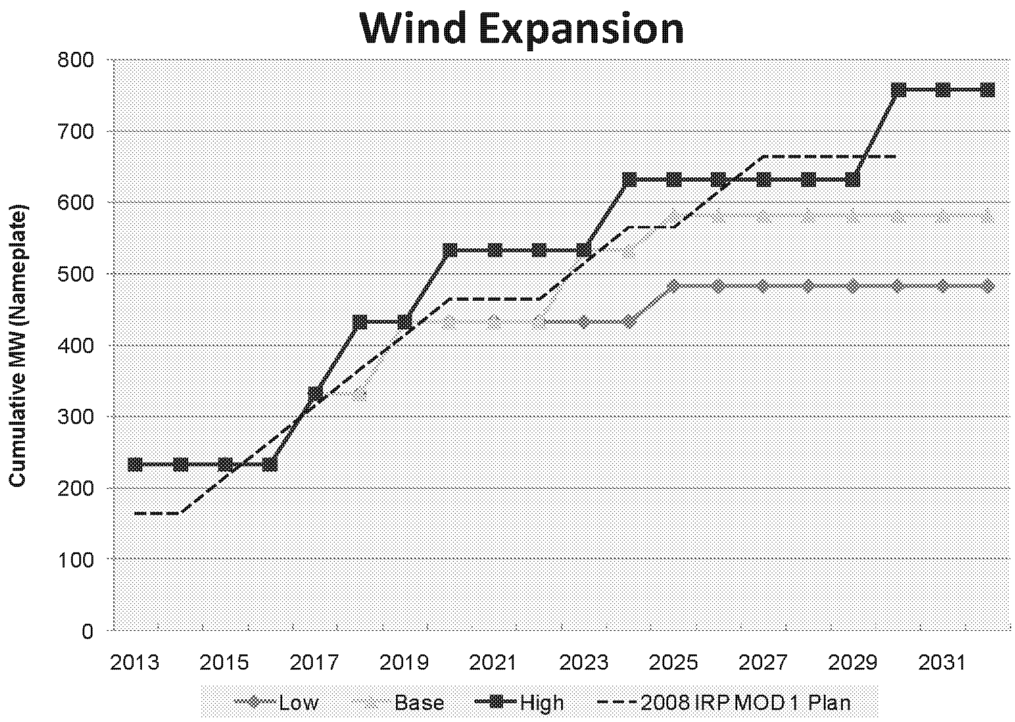
Wind/Energy Efficiency Assumptions

- Strategic Plan
  - Wind – 10% by 2020. Maintain at 10%.
  - EE – 2% by 2025
  - Maintains Board wind goal after 2020 & EE budget increases at a higher than nominal escalation rate after 2018
- Base
  - Combined wind/EE
    - 15% by 2025
      - EE = 2.5% & wind = 12.5 %
  - Increases wind goal after 2020, doubles EE budget in 2018 & EE budget increases at a higher than nominal escalation rate after 2018
- High
  - Combined wind/EE
    - 15% by 2020
      - EE = 2.5% & wind = 12.5 %
    - 20% by 2030
      - EE = 4.3% & wind = 15.7 %
  - Assumes immediate doubling of EE budget, budget doubles again by 2018, then higher than nominal escalation rate.

Wind

Every Proposed Resource Plan Included the Following:

- Strategic Plan – 480 MW and 1,690 GWh of Wind (~10% of native load) by 2032
- Base – 580 MW and 2,040 GWh of Wind (~ 12% of native load) by 2032; 3% of renewable target met by EE
- High – 760 MW and 2,650 GWh of Wind (~ 15% of native load) by 2032; 5% of renewable target met by EE
- Support
  - Strategic Plan IV
  - Diverse Generation


Wind Expansion
800
700
600
500
400
300
200
100
0
Cumulative MW (Nameplate)
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
Low
Base
High
2008 IRP MOD 1 Plan

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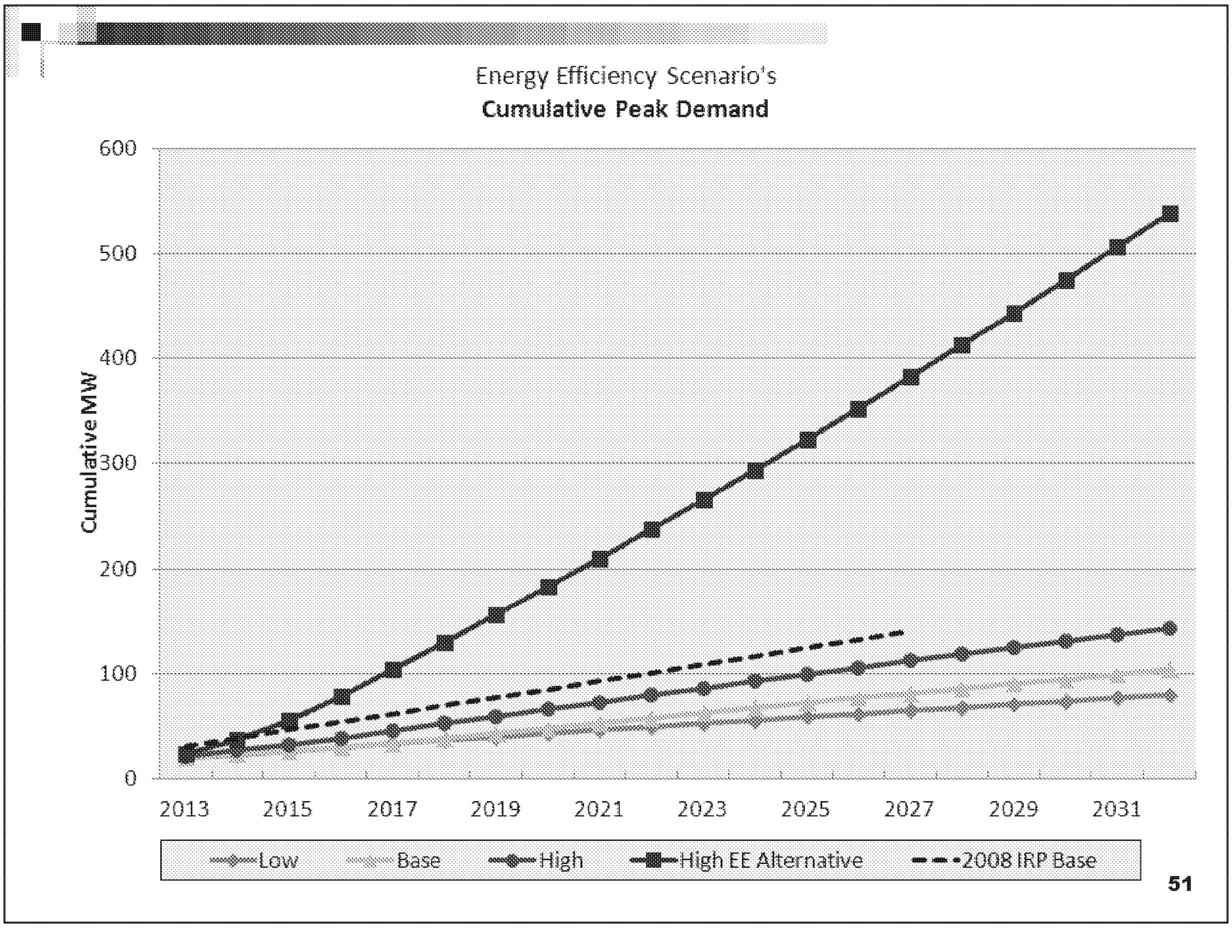
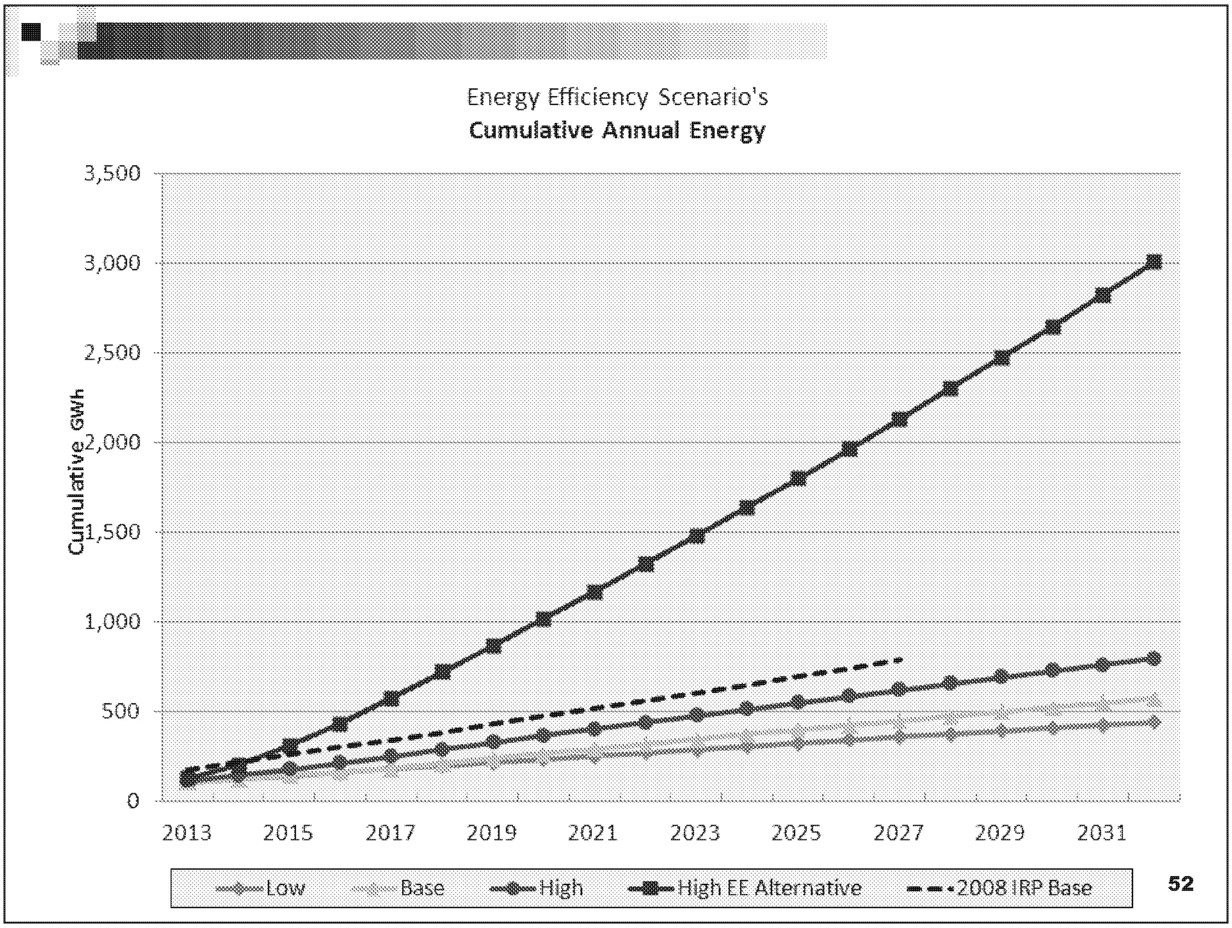
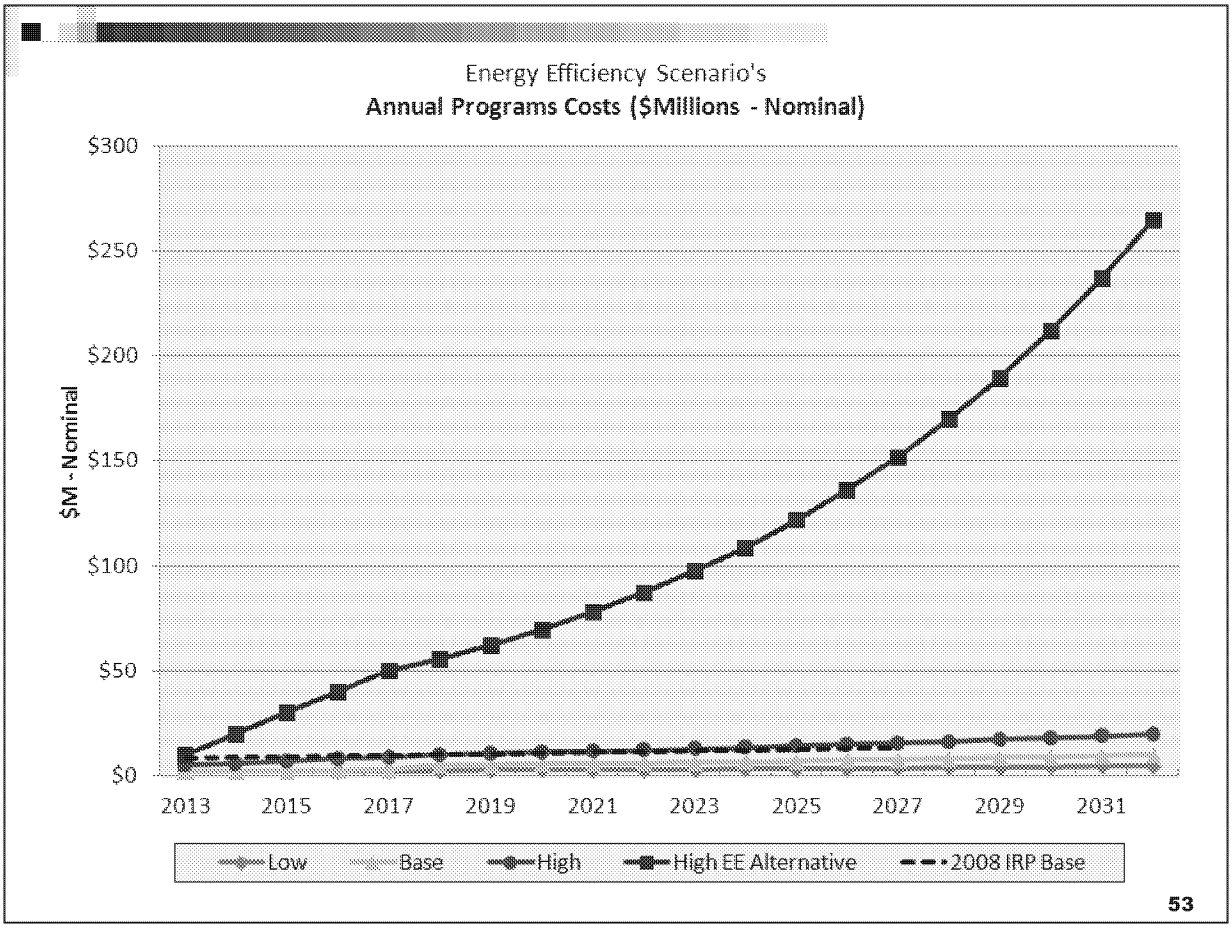
Energy Efficiency

Every Proposed Resource Plan Included the Following:

- 80 – 143 MW of energy efficiency
- 440 – 800 GWh of saved energy
- Percent of load being reduced with energy efficiency:
  - Energy 2.5% - 4.6%
  - Peak 2.6% - 4.1%
- Support
  - Brattle Group Survey (West North Central U.S.)
  - Sustainable Energy Department
- High EE Alternative per GOA team directive, comparable to neighboring state utilities with high investment in EE programs


Energy Efficiency Scenario's
Cumulative Peak Demand
Cumulative MW
600
500
400
300
200
100
0
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
Low
Base
High
High EE Alternative
2008 IRP Base
51


Energy Efficiency Scenario's
Cumulative Annual Energy
Cumulative GWh
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
Low
Base
High
High EE Alternative
2008 IRP Base
52

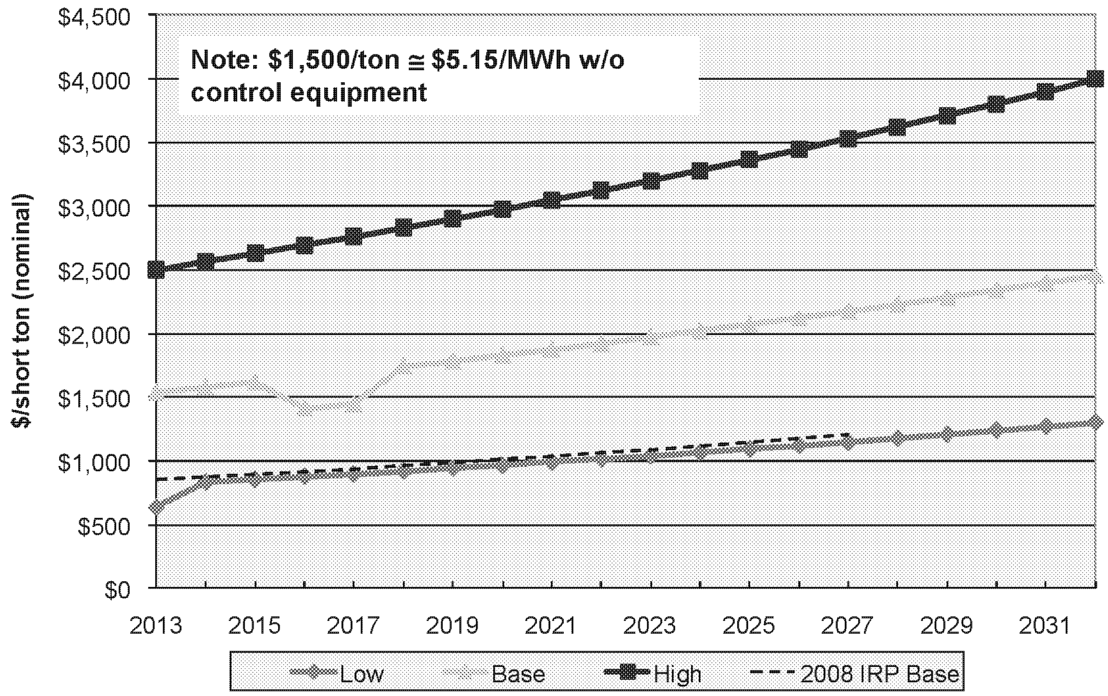

Energy Efficiency Scenario's
Annual Programs Costs ($Millions - Nominal)
$M - Nominal
$300
$250
$200
$150
$100
$50
$0
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
Low
Base
High
High EE Alternative
2008 IRP Base
53

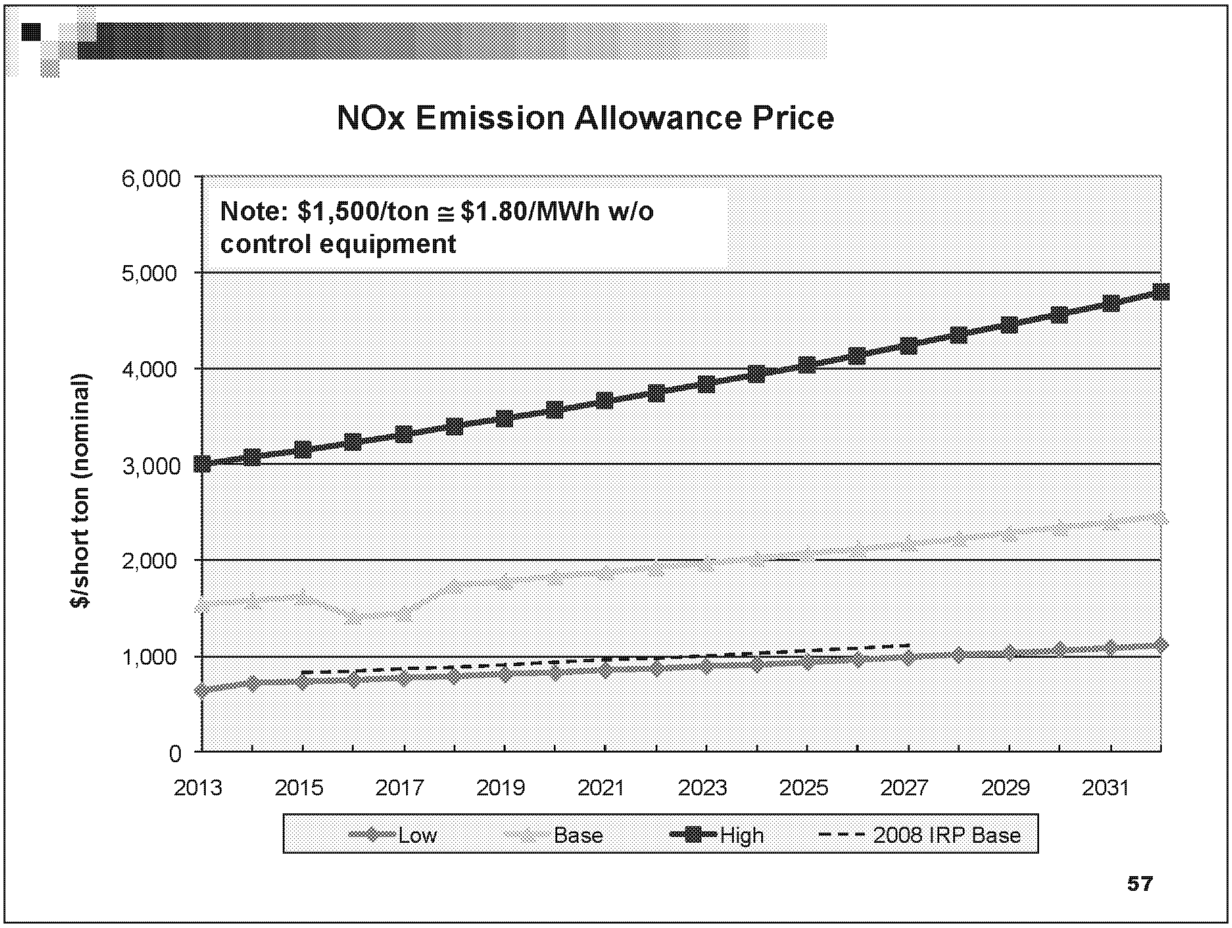
Environmental

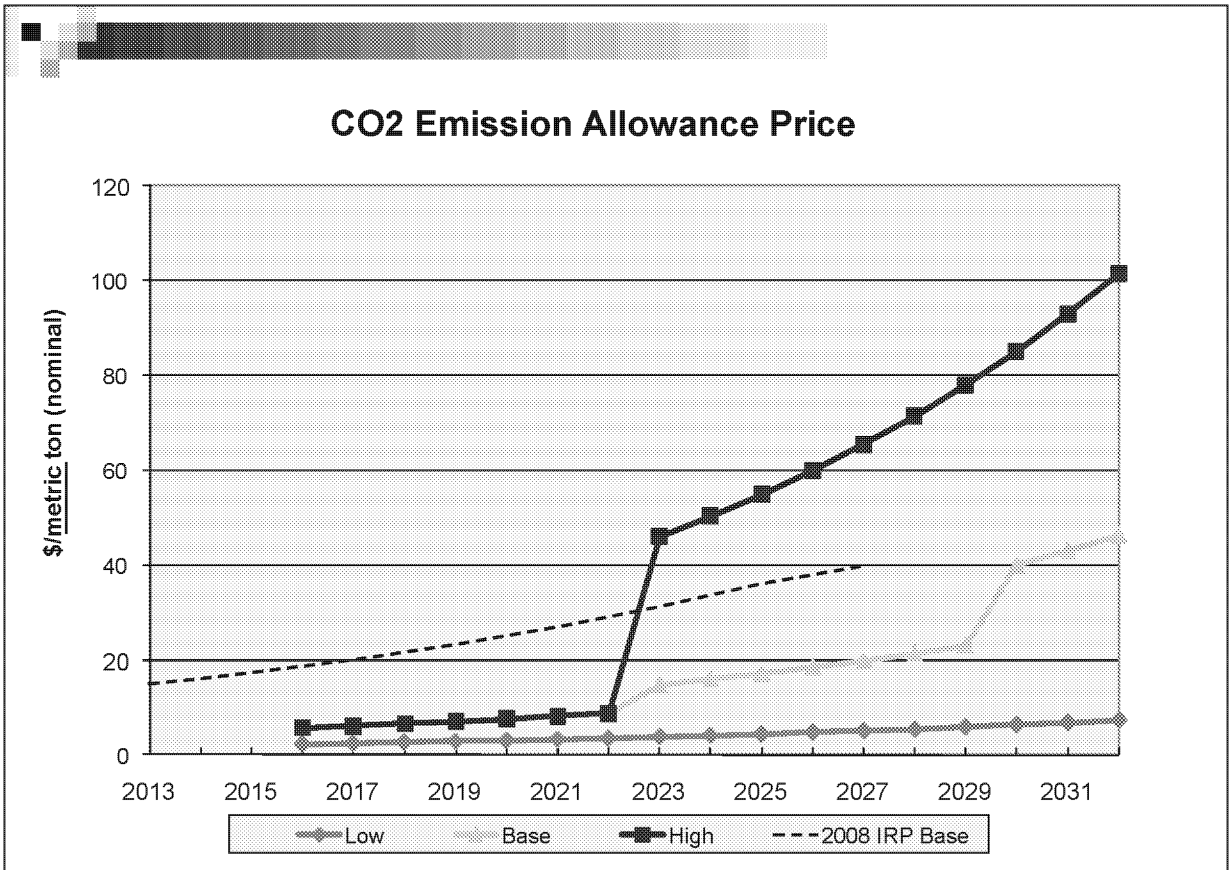
Environmental Regulations

- To operate our coal plants
  - Beyond 2023, the assumption that new and/or revisions to existing regulations would require NPPD to install full, or long-term MPCE
  - Beyond 2017 but not beyond 2023, the assumption that new and/or existing regulations would require NPPD to install bridge, or short-term MPCE
    - Since bridge MPCE is not as effective as full, there is more regulatory risk with this assumption
  - Beyond 2015, MATS would require Hg control. The GOA also assumed installation of over-fire air at Sheldon Unit 1 due to CSAPR

SO2 Emission Allowance Price




NOx Emission Allowance Price
Note: $1,500/ton ≅ $1.80/MWh w/o control equipment
$/short ton (nominal)
6,000
5,000
4,000
3,000
2,000
1,000
0
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
Low
Base
High
2008 IRP Base
57


CO2 Emission Allowance Price
$/metric ton (nominal)
120
100
80
60
40
20
0
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
Low
Base
High
2008 IRP Base

58

Gerald Gentleman 316(b) Options

- Low Case = $8 M dollars
- Base Case = $11.8 M dollars
- High Case = $169 M dollars

- Low Case: Existing screens with new fish removal system (Ristroph Baskets)
- Base Case: New 2mm fine mesh screens with new fish removal system (Ristroph Baskets)
- High Case: Cooling Towers

Cooper Nuclear Station 316(b) Options

- Low Case = $6.6 M dollars
- Base Case = $8 M dollars
- High Case = $300 M dollars

- Low Case: Existing screens with new fish removal system (Ristroph Baskets)
- Base Case: New 2mm fine mesh screens with new fish removal system (Ristroph Baskets)
- High Case: Cooling Tower

Multi-Pollutant Control Equipment (MPCE)

MPCE Alternatives

- Best Available Control Technology (BACT)
  - Also referred to as full, or long-term MPCE technology
  - GGS – wet scrubber for SO_2
  - SS – dry scrubber for SO_2
  - Selective Catalytic Reduction (SCR) for NO_x
- Bridge Technology
  - Also referred to as short-term MPCE technology
  - Dry Sorbent Injection (DSI) for SO_2
  - Selective Non-catalytic Reduction (SNCR) for NO_x
- Technology Common to BACT and Bridge
  - Activated Carbon Injection (ACI) for mercury
  - Baghouse for particulate matter (existing)

MPCE – BACT (Long-term Controls)

- Engineering completed – GGS 15%-20%; SS < 1%
- Assumptions
  - Conservative design inputs – proven design, reliable operation for GOA study period and beyond
  - Able to burn all Powder River Basin (PRB) coals with lowest achievable SO2 and NOx emissions levels
- Risk
  - Lengthy construction period 3-6 years
  - "Carbon-capture ready" design, but does not remove greenhouse gases
  - Mature technologies; complexities well understood (GGS) based upon degree of engineering completed

MPCE – BACT (Long-term Controls)

- Project Cost Estimates
  - GGS $1.54 billion
  - SS $213 million
- GGS Project Cost Opportunities
  - Current cost estimate contains conservative inputs and adders to account for unknown start date and associated escalation and market variability costs
  - If a certain, near-term start date can be established, less conservative inputs are required
    - **Resulting cost estimate would be $1.28 billion with 2013 start**

MPCE – Bridge (Short-term Controls)

- Engineering completed – GGS and SS < 1%
- Assumptions
  - Short service life for shutdown scenario (5-10 years); “throw away” design
  - Coal sulfur content limited; SO2 and NOx emissions levels reduced but not lowest achievable
- Risk
  - Not “Carbon-capture ready”, and does not remove greenhouse gases
  - Little experience on large units – possible unintended consequences on equipment and emissions
  - Experience of west coast plant using DSI – SO2 removal efficiency expected to be 50% on continuous basis

MPCE – Bridge (Short-term Controls)

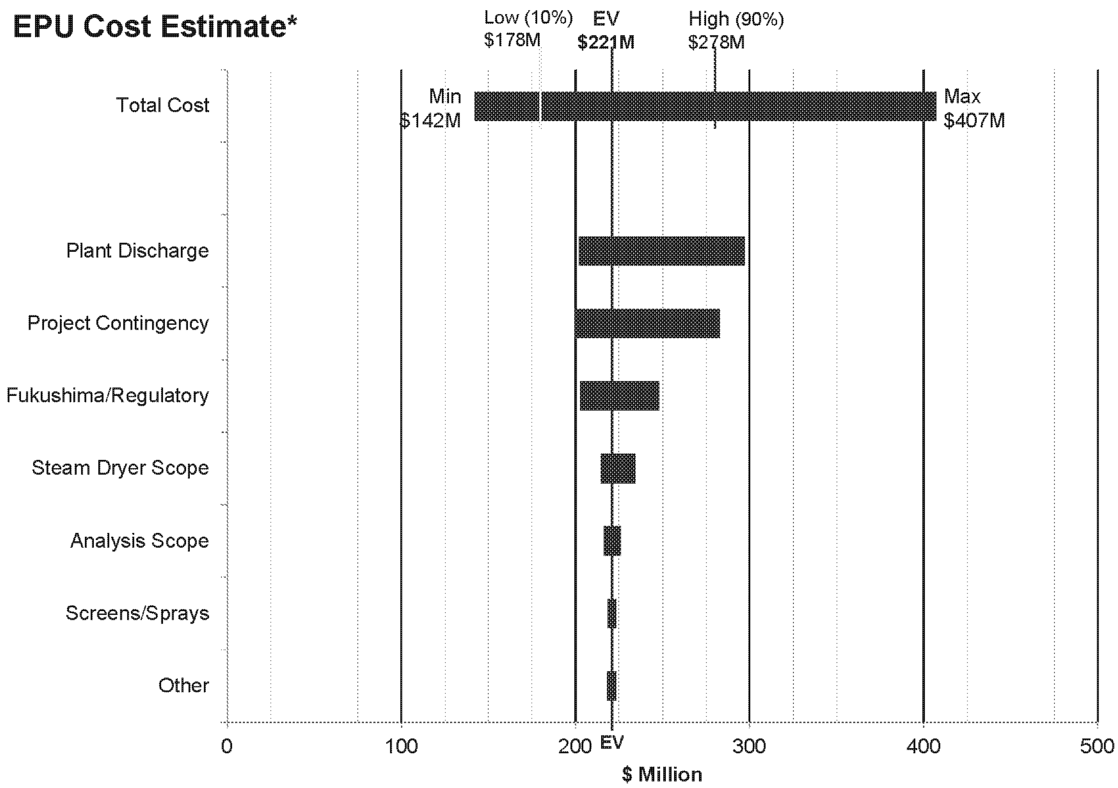
- Risk (continued)
  - Intended use would likely require EPA/NDEQ approval; industry experience may reduce likelihood of approval
  - Not much specific engineering completed
  - Lower capital cost but higher O&M cost on a $/ton removed basis compared to BACT
- Project Cost Estimate
  - GGS – $232 million
  - SS – $49 million

Cooper Nuclear Station
Power Uprate

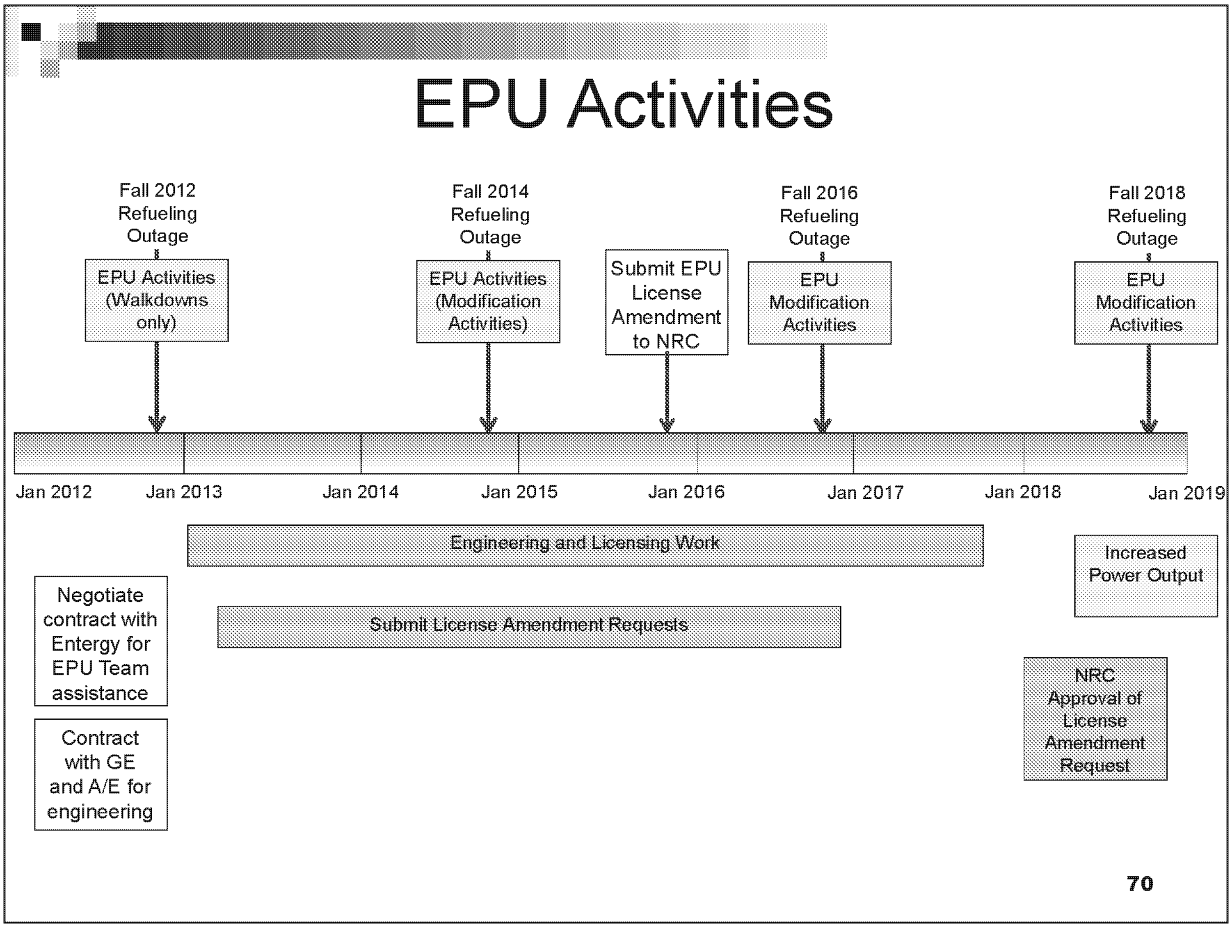
Background

- Power Uprate at Cooper Nuclear Station
  - 18.4% increase in power output or ~146 MWe
- The last Power Uprate at a Boiling Water Reactor (like Cooper) to be approved by the US Nuclear Regulatory Commission was Nine Mile Point 2 on 12/22/2011
- Entergy and Exelon Fleets pursuing EPUs – pace has slowed due to the current low price of Natural Gas
- NRC reports seven EPUs expected 2012 – 2016

EPU Cost Estimate*



*Used for GOA. Cost estimate for IRP will be updated.


EPU Activities
Fall 2012 Refueling Outage
EPU Activities (Walkdowns only)
Fall 2014 Refueling Outage
EPU Activities (Modification Activities)
Submit EPU License Amendment to NRC
Fall 2016 Refueling Outage
EPU Modification Activities
Fall 2018 Refueling Outage
EPU Modification Activities
Jan 2012
Jan 2013
Jan 2014
Jan 2015
Jan 2016
Jan 2017
Jan 2018
Jan 2019
Engineering and Licensing Work
Increased Power Output
Negotiate contract with Entergy for EPU Team assistance
Submit License Amendment Requests
NRC Approval of License Amendment Request
Contract with GE and A/E for engineering
70

EPU Advantages

- There are several plant issues included in the EPU cost that are likely to be needed whether EPU goes forward or not
  - Approximately $50M in capital cost or about 25% of planned EPU cost
  - If done as part of an EPU, benefit from an additional 146 MWe
- The equipment replacement that is required for an additional 20 years of operation was designed to accommodate EPU (e.g., Generator, LP Turbines, Feed Water Heaters, Main Power Transformers)
- Industry response to the Fukushima accident will involve re-analysis and possible plant modifications in some of the same areas that have to be addressed by EPU – could be synergy
- Entergy Fleet EPU team can be engaged to assist with the project

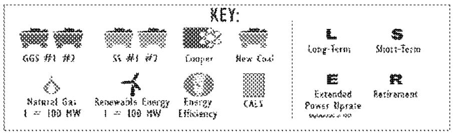
EPU Advantages

- Adding 146 MWe at CNS adds very little additional O&M expense
  - No new land or buildings
  - Little additional equipment and little or no new staff
- Cost of generation ($/MWh) at Cooper should decrease slightly
- The project plan will include:
  - Early investigation and resolution of known risks
  - Early investigation of areas likely to contain surprises
  - Establishment of early "off-ramps" should issues emerge
  - Strategies to achieve some limited version of uprated power, in the event of an unexpected issue that makes a core thermal power uprate impractical or too expensive

GOA PRELIMINARY RESULTS

Preliminary Resource Plans Under Consideration

Every scenario includes between 10-20% (480-760 MW) renewable energy and energy efficiency, and 800 MW of energy from Cooper Nuclear Station.



Resource Plan 1 Cost = $17.05 billion

Resource Plan	Additional Cost/ Impact to Customers*	Resource Description	Resource Graphical Depiction	Year of First New Resource
1	0	[illegible]		2027
2	$60 million	[illegible]		2027
3	$220 million	[illegible]		2032
4	$330 million	[illegible]		2021
5	$330 million	[illegible]		2024
6	$350 million	[illegible]		2024
7	$370 million	[illegible]		2024
8	$430 million	[illegible]		2028
9	$650 million	[illegible]		2024
10	$690 million	[illegible]		2024
11	$740 million	[illegible]		2022
12	$1 billion	[illegible]		2018
13	$1.29 billion	[illegible]		2018
14	$1.32 billion	[illegible]		2022
15	$1.33 billion	[illegible]		2024
16	$1.36 billion	[illegible]		2024
17	$1.60 billion	[illegible]		2018
18	$1.61 billion	[illegible]		2018

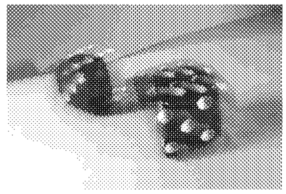
* Net Present Value: The present value of an investment's future net cash flows minus the initial investment

• Short-term technology is unproven. Adds to the complexity of our decision.

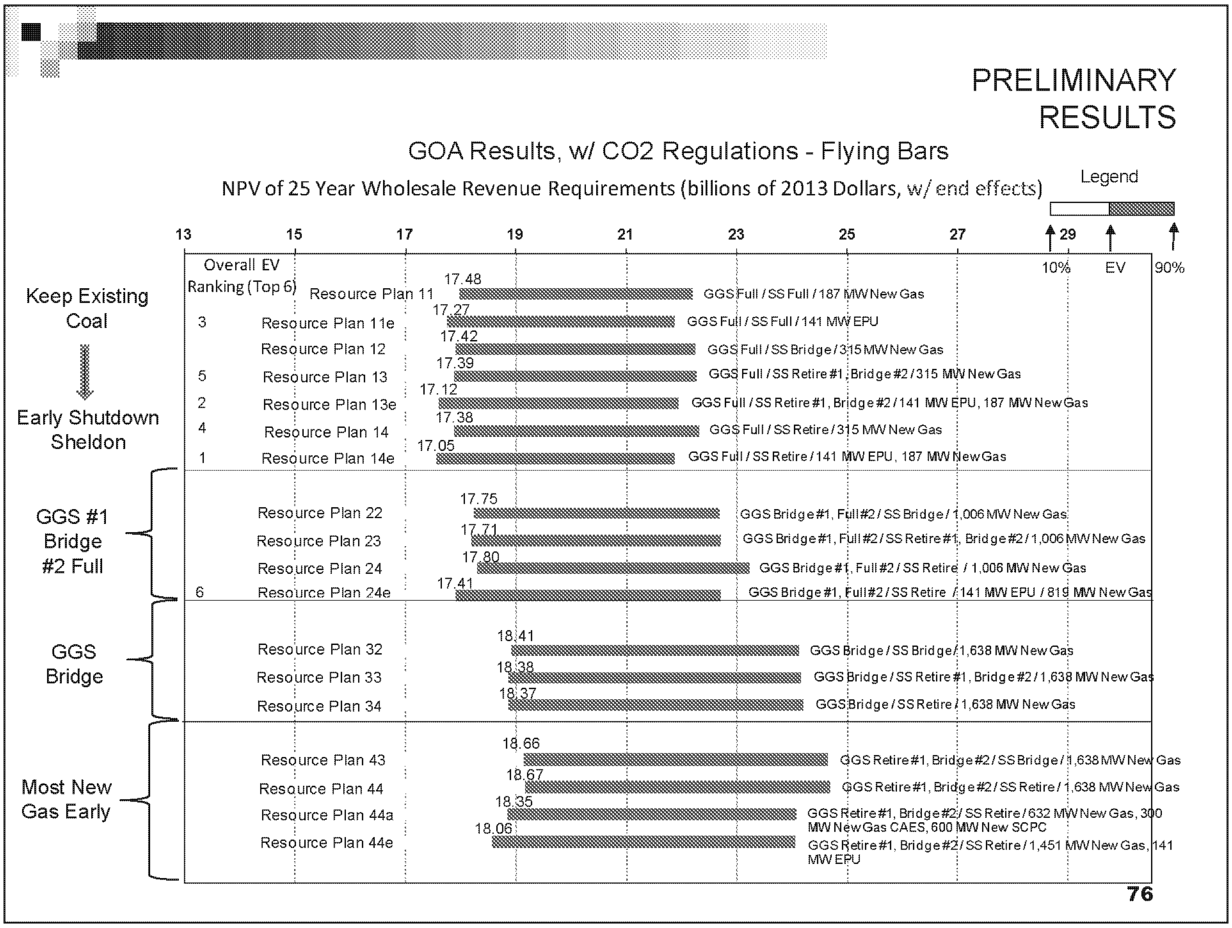
Margin of Uncertainty

PRELIMINARY RESULTS

- As Monte Carlo simulation relies upon random draws of possible outcomes, there is some inherent uncertainty in the results, based upon the number of draws and the range of resulting values
- This is similar in concept to the margin of error in polling results



- This uncertainty should be considered when trying to distinguish between Resource Plan NPV's
- Based on the GOA parameters and resulting ranges:
  - If the NPV of two plans differs by $100M or more, we can be highly confident there is truly a difference between them
  - If the NPV of two plans differs by $50M, we can still be reasonably confident that the same is true
  - If the NPV of two plans differs by some amount less than $50M, we should conclude the plans are basically equivalent


PRELIMINARY RESULTS
GOA Results, w/ CO2 Regulations - Flying Bars
NPV of 25 Year Wholesale Revenue Requirements (billions of 2013 Dollars, w/ end effects)
Legend
10%
EV
90%
13
15
17
19
21
23
25
27
29
Overall EV Ranking (Top 6)
Keep Existing Coal
Early Shutdown Sheldon
Resource Plan 11
17.48
GGS Full / SS Full / 187 MW New Gas
3
Resource Plan 11e
17.27
GGS Full / SS Full / 141 MW EPU
Resource Plan 12
17.42
GGS Full / SS Bridge / 315 MW New Gas
5
Resource Plan 13
17.39
GGS Full / SS Retire #1, Bridge #2 / 315 MW New Gas
2
Resource Plan 13e
17.12
GGS Full / SS Retire #1, Bridge #2 / 141 MW EPU, 187 MW New Gas
4
Resource Plan 14
17.38
GGS Full / SS Retire / 315 MW New Gas
1
Resource Plan 14e
17.05
GGS Full / SS Retire / 141 MW EPU, 187 MW New Gas
GGS #1 Bridge #2 Full
Resource Plan 22
17.75
GGS Bridge #1, Full #2 / SS Bridge / 1,006 MW New Gas
Resource Plan 23
17.71
GGS Bridge #1, Full #2 / SS Retire #1, Bridge #2 / 1,006 MW New Gas
Resource Plan 24
17.80
GGS Bridge #1, Full #2 / SS Retire / 1,006 MW New Gas
6
Resource Plan 24e
17.41
GGS Bridge #1, Full #2 / SS Retire / 141 MW EPU / 819 MW New Gas
GGS Bridge
Resource Plan 32
18.41
GGS Bridge / SS Bridge / 1,638 MW New Gas
Resource Plan 33
18.38
GGS Bridge / SS Retire #1, Bridge #2 / 1,638 MW New Gas
Resource Plan 34
18.37
GGS Bridge / SS Retire / 1,638 MW New Gas
Most New Gas Early
Resource Plan 43
18.66
GGS Retire #1, Bridge #2 / SS Bridge / 1,638 MW New Gas
Resource Plan 44
18.67
GGS Retire #1, Bridge #2 / SS Retire / 1,638 MW New Gas
Resource Plan 44a
18.35
GGS Retire #1, Bridge #2 / SS Retire / 632 MW New Gas, 300 MW New Gas CAES, 600 MW New SCPC
Resource Plan 44e
18.06
GGS Retire #1, Bridge #2 / SS Retire / 1,451 MW New Gas, 141 MW EPU
76

PRELIMINARY RESULTS

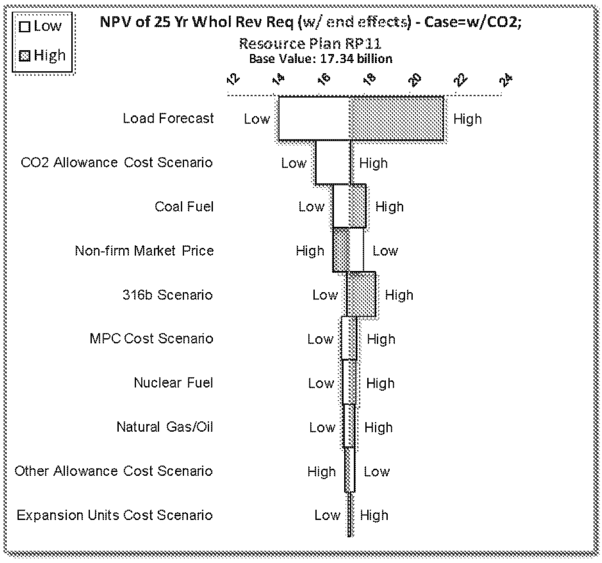
Flying Bar Observations

- The costs of resource plans that have long-term environment equipment at GGS have lower costs than those that retire GGS early or have short-term environment equipment installed.
- The costs of resource plans with Extended Power Uprate at Cooper Nuclear Station have lower costs than those without Extended Power Uprate.
- The costs of resource plans with different Sheldon options are fairly close to one another. Additional evaluation is needed.

GOA Preliminary Results Sensitivity

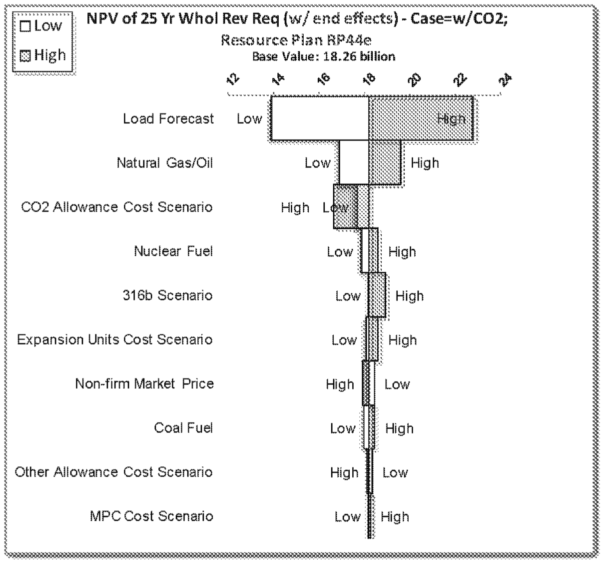
PRELIMINARY
RESULTS

Most Coal Resources



GGS Full / SS Full / 187 MW New Gas

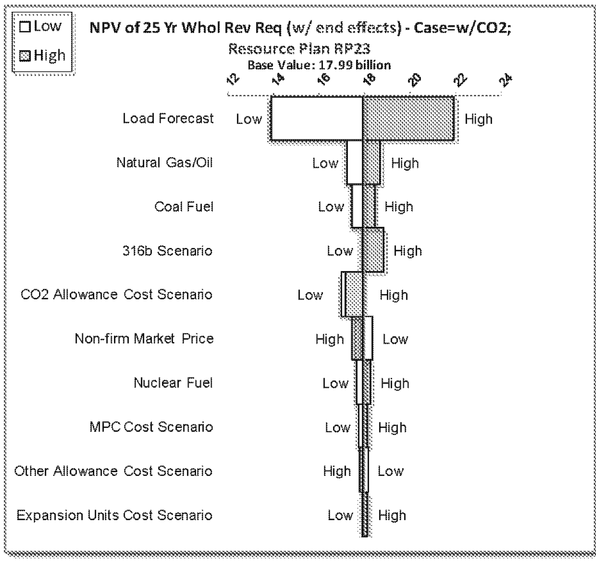
Fewest Coal Resources



GGS Retire #1, Bridge #2 / SS Retire / 1,451 MW New Gas / 141 MW EPU

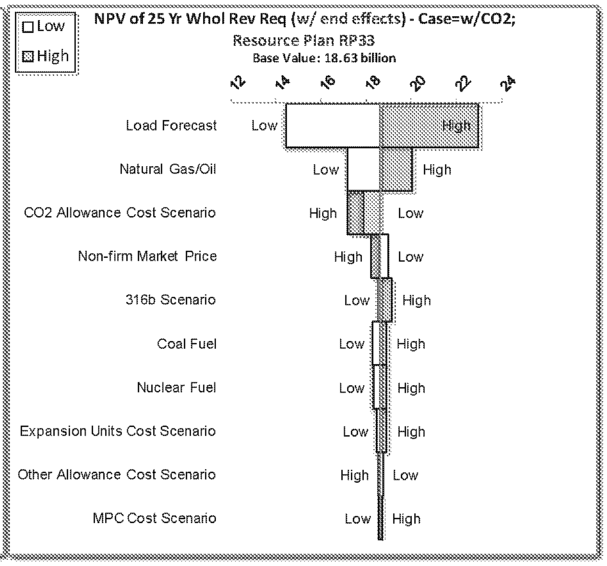
PRELIMINARY RESULTS

GGS Bridge #1, Full #2



GGS Bridge #1, Full #2 / SS Retire #1, Bridge #2 / 1,006 MW New Gas

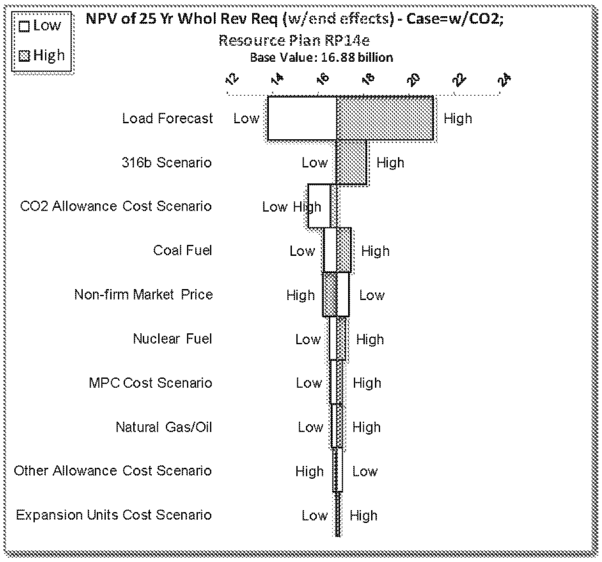
GGS Bridge



GGS Bridge / SS Retire #1, Bridge #2 / 1,638 MW New Gas

PRELIMINARY
RESULTS

Lowest NPV EV Plan



GGS Full / SS Retire /
187 MW New Gas, 141 MW EPU

PRELIMINARY RESULTS

Risks Not Modeled or Not Fully Modeled
CNS EPU

Risks	Magnitude
Open up CNS design basis	**CCCCC**
EPU distracts from CNS's core business	**CCCC**
NRC delays EPU approval	**CCCC**
NRC impose additional requirements (Fukushima)	**CCC**
Unforeseen Technical Issue	**CC**
Additional Environmental Requirements	**CC**
Output lower than expected	**C**

CCCCC - Most Risk

PRELIMINARY RESULTS

Risks Not Modeled or Not Fully Modeled
GGS & Sheldon

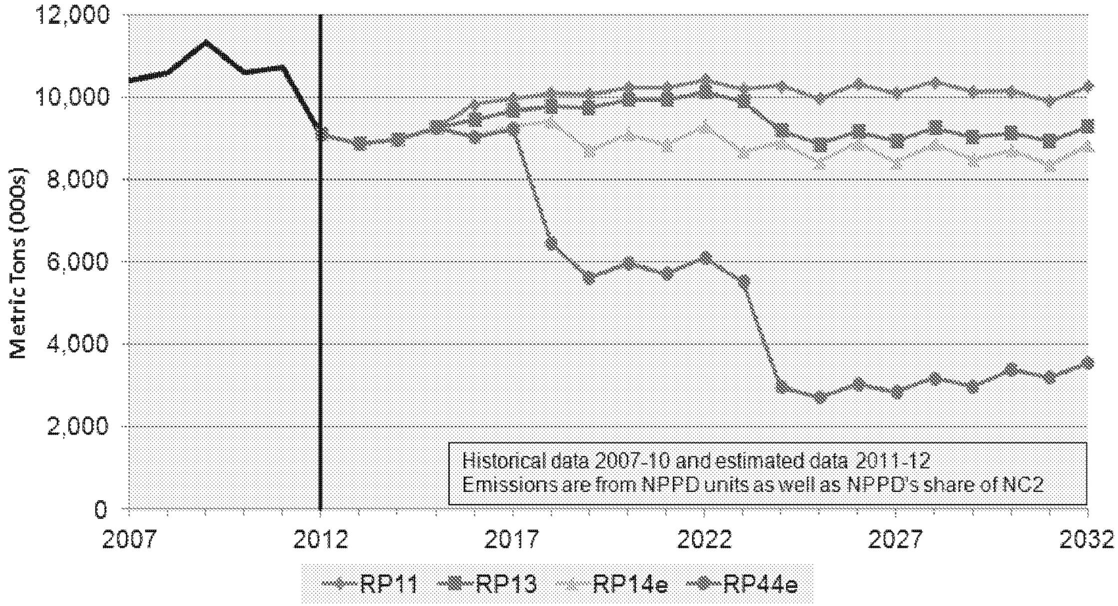
GGS 1	retires end of 2017	bridge, retires 2023	bridge, retires 2023	full
GGS 2	bridge, retires 2023	bridge, retires 2023	full	full
Sheldon 1	retires 2015	retires 2015	bridge, retires 2023	full
Sheldon 2	retires 2015	bridge, retires 2023	bridge, retires 2023	full
Risks	Less Coal	to		More Coal
Environmental Regulations	GGG	GGGGG S	GGG SS	
Equipment Design	GGG	GGGGG S	GGG S	
Natural Gas Pipeline	GGGGG SS	GGGGG S	GGGG S	
Reduce Coal Generation Capacity *	GGGGG SS	GGG S	GGG S	

GGGGG - Most Risk, **G** is for GGS, S is for Sheldon

* - Reduction in coal capacity is shown as a risk. For some "futures" (e.g., high CO2 costs), the opposite may be true.

PRELIMINARY
RESULTS

CO2 Emissions for Various Resource Plans



Preliminary Updates for 2012/2013 IRP

Wind Assumptions [1]

		GOA 2020	GOA 2025	GOA 2030			2012 IRP 2020	2012 IRP 2025	2012 IRP 2030
NPPD Strategic Plan	%	10%	10%	10%	**NPPD Strategic Plan**	%	10%	10%	10%
	MWs	430	480	480		MWs	430	430	460
Base [2]	%	12%	15%	15%	**Med**	%	12%	15%	15%
	MWs	430	580	580		MWs	480	630	680
High [2]	%	15%	17%	20%	**High**	%	15%	17%	20%
	MWs	530	630	760		MWs	580	680	880
Alt High	%	Not Fully Evaluated			**Alt High**	%	15%	25%	30%
	MWs					MWs	580	930	1,130

(1) Equivalent MW target amounts shown were calculated based on NPPD's Base Load forecast. Required MW values would be different under the NPPD Strategic Plan or High forecast scenarios.

(2) For the GOA, it was assumed that a portion of the renewable energy targets could be met by Energy Efficiency reductions under the Base and High scenarios.

Energy Efficiency (1)

		GOA					2012 IRP		
		2020	2025	2030			2020	2025	2030
Current	%	1.6%	2.1%	2.5%	**Current**	%	1.6%	2.1%	2.5%
	MWs	43	59	74		MWs	43	59	74
Base	%	1.8%	2.6%	3.2%	**Med**	%	1.8%	2.6%	3.2%
	MWs	48	72	95		MWs	48	72	95
High	%	2.5%	3.5%	4.5%	**High**	%	2.5%	3.5%	4.5%
	MWs	66	99	131		MWs	66	99	131
Alt High	%	Not Fully Evaluated			**Alt High**	%	6.9%	11.5%	16.1%
	MWs					MWs	183	323	475

(1)Load reduction percentage values were calculated based on NPPD's Base Load Forecast. Calculated percentage values would be different under the Current or High Forecast scenarios.

Preliminary Proposed Updates for IRP

- Review Natural Gas Projections
- Review Non-firm Electric Market Price Projections
- Review Environmental Assumptions
- Review of MPCE Cost Assumptions
- Review CNS Power Uprate Cost Assumptions

Proposed IRP - Resource Plans to be Modeled (Preliminary)

Step 1

	GGS			Sheldon					
	Unit 1	Unit 2	CNS	Unit 1	Unit 2	Canaday	Wind	EE	New Resources
1	L	L	EPU	L	L	Retire	Strategic Plan	Current	RICE
2	L	L	EPU	Retire	S	Retire	Strategic Plan	Current	RICE
3	L	L	EPU	Retire	Retire	Retire	Strategic Plan	Current	CC
4	S	L	EPU	S	S	Retire	Strategic Plan	Current	RICE, CC
5	S	L	EPU	Retire	Retire	Retire	Strategic Plan	Current	RICE, CC
6	S	S	EPU	Retire	S	Retire	Strategic Plan	Current	RICE, CC
7	S	S	EPU	Retire	Retire	Retire	Strategic Plan	Current	RICE, CC
8	Retire	S	EPU	Retire	Retire	Retire	Strategic Plan	Current	RICE, CC
9	Retire	Retire	EPU	Retire	Retire	Retire	Strategic Plan	Current	RICE, CC
10	Retire	Retire	EPU	Retire	Retire	Retire	alt High *	alt High	RICE, CAES
11	Retire	L	EPU	Retire	Retire	Retire	alt High	alt High	RICE, CAES
12	L	L	EPU	Retire	Retire	Retire	Med or High	Med or High	CC, CAES

* Wind build is accelerated such that most is on-line when GGS retires

Step 2

1 Run lowest cost 1 or 2 plans without EPU
2 Run lowest cost 1 or 2 plans with Canaday
3 Run lowest cost 3 or 4 plans with Medium or High Wind and Energy Efficiency

Step 3

1 Provide Wind Cost Sensitivity on the top plan per Director Thompson request $35/MWH escalated at 2.5%
2 Provide preliminary results and see if other cases are necessary

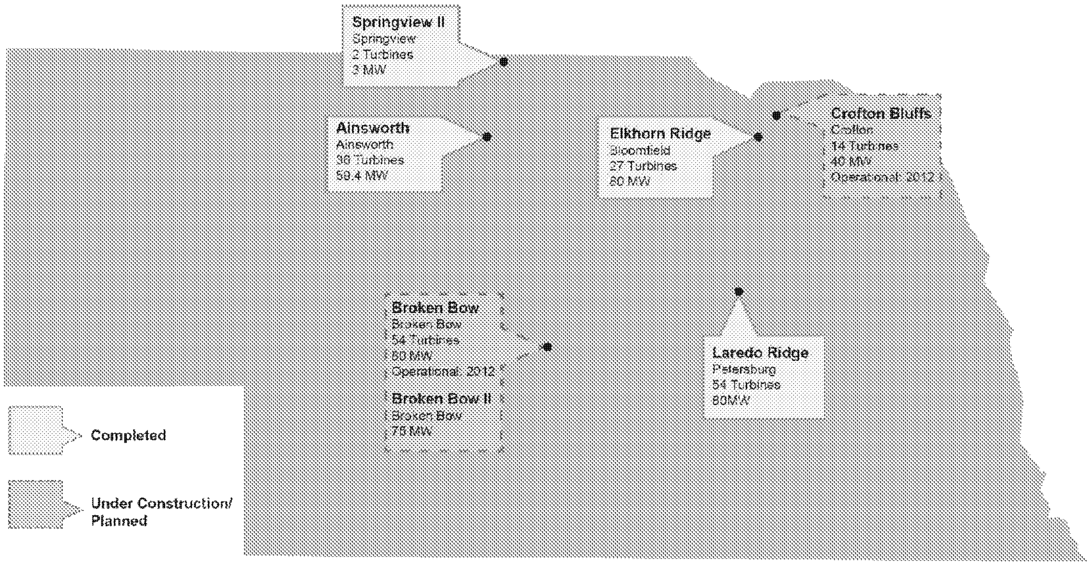
RICE = Gas Peaker
CC = Gas Combined Cycle
CAES = Compressed Air Energy Storage
L = Long-term Environmental Control Equipment (BACT for SO_2 and NO_x)
S = Short-term Environmental Control Equipment (Bridge for SO2 and NOx) retire Plant before end of useful life

IRP Schedule for Discussion - June 2012 Board

2012	Feb	GOA Board Retreat
	Mar-May	GOA Open Houses
	Jun-Jul	Continue Public Outreach
		– Virtual Behind the Outlet GOA Open House on NPPD.com – GOA Presentations at Community Clubs – Customer Discussions / Workshop
		Continue NPPD Board Input for IRP
		– June Review Preliminary IRP Resource Plan Scenarios – Resource Planning Staff available to discuss GOA results and IRP with Board members individually or in small groups
	Aug-Sep	– August GOA/IRP Board Retreat
		NPPD Resource Planning Update IRP Assumptions and Re-run Model
	Oct	NPPD Resource Planning Write IRP Report
	Nov	NPPD EPU Transmission Service Request with SPP
		IRP Public Sessions – Discuss Results
	Dec	NPPD Board consider approval of CNS EPU
2013	Jan	Finalize IRP Report
	Feb-May	NPPD Board consider approval of IRP
		IRP submittal made to WAPA (will need approval from WAPA)

Additional Info

Wind Energy Generation Facilities



2011 Monthly Wind Generation and Load Requirements